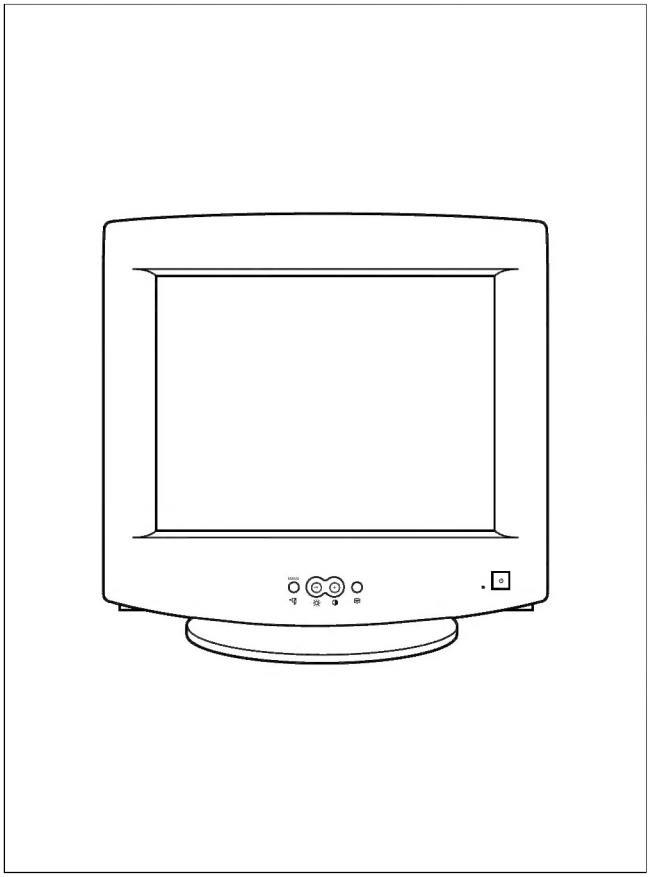
SAMSUNG

COLOR MONITOR

CHB5707L/5237L
CHB6107L(M)/6117L(M)
CHB7707L(M)/7227L(M)/7727L(M)

SERVICE Manual

COLOR MONITOR



CONTENTS

1. Precautions
2. Reference Information
3. Product Specifications
4. Operating Instructions
5. Disassembly & Reassembly
6. Alignment & Adjustments
7. Troubleshooting
8. Exploded View & Parts List
9. Electrical Parts List
10. Block Diagram
11. PCB Diagrams
12. Wiring Diagram
13. Schematic Diagrams

Samsung Electronics Co., Ltd. September 1998
Printed in Korea
Code No.: BH68-61129A

1 Precautions

1-1 Safety Precautions

WARNINGS

1. For continued safety, do not attempt to modify the circuit board.
2. Disconnect the AC power before servicing.
3. When the chassis is operating, semiconductor heatsinks are potential shock hazards.

1-1-1 Servicing the High Voltage VR and CRT :

WARNING: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

Caution: When replacing the high voltage adjustment VR, it must be fixed by a soldering iron after it is properly set.

1. When servicing the high voltage system, remove the static charge by connecting a 10 kohm resistor in series with an insulated wire (such as a test probe) between the chassis and the anode lead.
2. If the HV VR requires adjustment, (a) Replace the VR and adjust the high voltage to the specification. (b) Use a soldering iron to melt the adjustment cap on the HV VR to prevent any movement.
3. When troubleshooting a monitor with excessively HV, avoid being unnecessarily close to the monitor. Do not operate the monitor for longer than is necessary to locate the cause of excessive voltage.
4. High voltage should always be kept at the rated value, no higher. Only when high voltage is excessive are X-rays capable of penetrating the shell of the CRT, including the lead in glass material. Operation at high voltages may also cause failure of the CRT or high voltage circuitry.
5. When the HV regulator is operating properly, there is no possibility of an X-ray problem. Make sure the HV does not exceed its specified value and that it is regulating correctly.
6. The CRT is especially designed to prohibit X-ray emissions. To ensure continued X-ray protection, replace the CRT only with one that is the same or equivalent type as the original.
7. Handle the CRT only when wearing shatterproof goggles and after completely discharging the high voltage anode.
8. Do not lift the CRT by the neck.

1-1-2 Fire and Shock Hazard :

Before returning the monitor to the user, perform the following safety checks:

1. Inspect each lead dress to make certain that the leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the monitor.
2. Inspect all protective devices such as nonmetallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. Leakage Current Hot Check (Figure 1-1):
   WARNING: Do not use an isolation transformer during this test.

   Use a leakage current tester or a metering system that complies with American National Standards Institute (*ANSI C101.1, Leakage Current for Appliances*), and Underwriters Laboratories (*UL Publication UL1410, 59.7*).
4. With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. With the unit's AC switch first in the ON position and then OFF, measure the current between a known earth ground (metal water pipe, conduit, etc.) and all exposed metal parts, including: metal cabinets, screwheads and control shafts. The current measured should not exceed 0.5 milliamp. Reverse the power-plug prongs in the AC outlet and repeat the test.

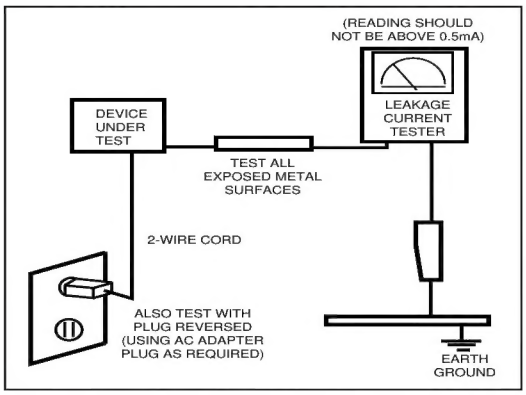

(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Figure 1-1. Leakage Current Test Circuit

1-1-4 Product Safety Notices

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection. The protection they give may not be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by ⚠ on schematics and parts lists. A substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and / or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

Components identified by ☢ on schematics and parts lists must be sealed by a soldering iron after replacement and adjustment.

1-2 Servicing Precautions

WARNING1: First read the "Safety Precautions" section of this manual. If unforeseen circumstances create conflict between the servicing precautions and safety precautions, always follow the safety precautions.

WARNING2: A high voltage VR replaced in the wrong direction may cause excessive X-ray emissions.

WARNING3: An electrolytic capacitor installed with the wrong polarity might explode.

1. Servicing precautions are printed on the cabinet, and should be followed closely.
2. Always unplug the unit's AC power cord from the AC power source before attempting to: (a) remove or reinstall any component or assembly, (b) disconnect PCB plugs or connectors, (c) connect all test components in parallel with an electrolytic capacitor.
3. Some components are raised above the printed circuit board for safety. An insulation tube or tape is sometimes used. The internal wiring is sometimes clamped to prevent contact with thermally hot components. Reinstall all such elements to their original position.
4. After servicing, always check that the screws, components and wiring have been correctly reinstalled. Make sure that the area around the serviced part has not been damaged.
5. Check the insulation between the blades of the AC plug and accessible conductive parts (examples: metal panels, input terminals and earphone jacks).
6. Insulation Checking Procedure: Disconnect the power cord from the AC source and turn the power switch ON. Connect an insulation resistance meter (500 V) to the blades of the AC plug.

   The insulation resistance between each blade of the AC plug and accessible conductive parts (see above) should be greater than 1 megohm.
7. Never defeat any of the +B voltage interlocks. Do not apply AC power to the unit (or any of its assemblies) unless all solid-state heat sinks are correctly installed.
8. Always connect a test instrument's ground lead to the instrument chassis ground *before* connecting the positive lead; always remove the instrument's ground lead last.

1-3 Electrostatically Sensitive Devices (ESD) Precautions

Some semiconductor (solid state) devices can be easily damaged by static electricity. Such components are commonly called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors. The following techniques will reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor components or assemblies, drain the electrostatic charge from your body by touching a known earth ground. Alternatively, wear a discharging wrist-strap device. To avoid a shock hazard, be sure to remove the wrist strap before applying power to the monitor.
2. After removing an ESD-equipped assembly, place it on a conductive surface such as aluminum foil to prevent accumulation of an electrostatic charge.
3. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESDs.
4. Use only a grounded-tip soldering iron to solder or desolder ESDs.
5. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its protective package until you are ready to install it. Most replacement ESDs are packaged with leads that are electrically shorted together by conductive foam, aluminum foil or other conductive materials.
7. Immediately before removing the protective material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution: Be sure no power is applied to the chassis or circuit and observe all other safety precautions.
8. Minimize body motions when handling unpackaged replacement ESDs. Motions such as brushing clothes together, or lifting your foot from a carpeted floor can generate enough static electricity to damage an ESD.
9. ⚠ Indicates ESDs on the Schematic Diagram in this manual.

2 Reference Information

2-1 List of Abbreviations, Symbols and Acronyms

2-1-1 Abbreviations

Abbreviation	Definition
ASS'Y	Assembly
B	Blue
B+ADJ	B+Adjustment
B-CUT	Blue-Cutoff
B-GAIN	Blue Gain
BRIGHT	Brightness
C	R-Composition
C-MIC	Condenser Microphone
CLK	Clock
CM	R-Cement
CN	Connector
CONT	Contrast
D-SUB	D-Subminiature
EEP-CLK	Electrically Erasable and Programmable Clock
EXT	External
EXT-MIC	External Microphone
Freq.	Frequency
FU	Fusible
G	Green
G-CUT	Green-Cutoff
G-GAIN	Green Gain
GND	Ground
H	Horizontal
H	Heater
H-DRV	Horizontal Drive
H-DY	Horizontal Deflection York
H-FLB	Horizontal Flyback
H-FV	Horizontal-Feedback Voltage
H-LIN	Horizontal Linearity
H-POSI	Horizontal Position
H-SIZE	Horizontal Size
H/PHONE	Headphone
Hz	Hertz
I-SENSE	Current-Sense
lb	Pound
MAX	Maximum
MIC	Microphone
MIN	Minimum
MP	C-Metalized Polyester
MPP	Metal Polypropylene
MO	R-Metal Oxide

Abbreviation	Definition
OSC	Oscillator
P	C-Polyester
PARA	Parabola
PARALL	Parallelogram
PIN-BAL	Pincushion Balance
PRE-AMP	Pre-Amplifier
PS1	Power Saving1 (suspend)
PS2	Power Saving2 (off)
PWR	Power
R	Red
R-CUT	Red-Cutoff
R-GAIN	Red Gain
RST	Reset
S-PIN	Side Pincushion
S-RASTER	Self Raster
S/W	Switch
SCAP	S Correction Capacitor
SPK	Speaker
SYNC	Synchronization
T	C-Tantalum
TR	Transistor
TRAP	Trapezoid
U-COM	Microprocessor
V	Vertical
V-DY	Vertical Deflection York
V-FLB	Vertical Flyback
V-LIN	Vertical Linearity
V-MUTE	Video Mute
V-OUT	Vertical Output
V-PARA	Vertical Parabola
V-POL	V-Polarity
V-POSI	Vertical Position
V-SENSE	Voltage-Sense
V-SIZE	Vertical Size
WW	R-Wire Wound
X-TAL	Crystal
Ω	ohm
KΩ	1000 ohm
MΩ	1000 KΩ
uF	microfarad (10^{-6}F)
nF	nanofarad (10^{-9}F)
pF	picofarad (10^{-12}F)

2-1-2 Symbols

Can emit X-radiation

Hot Ground

Cold Ground

Electrostatically Sensitive Device (ESD)

Provides special safety considerations

2-1-2 Acronyms

Acronym	Definition
ABL	Automatic Brightness Limits
AC	Alternating Current
ACL	Automatic Contrast Limit
AFC	Automatic Frequency Control
ANSI	American National Standards Institute
CMOS	Complementary Metal Oxide Semiconductor
CRT	Cathode Ray Tube
DC	Direct Current
DDC	Data Display Channel
DF	Dynamic Focus
DMM	Digital Multimeter
DPMS	Display Power Management Signaling
DVM	Digital Voltmeter
DY	Deflection York
EEPROM	Electrically Erasable and Programmable Read only Memory
ESD	Electrostatically Sensitive Device
ESF	Electronic Static Field
FBT	Flyback Transformer
FET	Field Effect Transistor
FH	Horizontal Frequency
FS	Fail Safe
FV	Vertical Frequency
GD	Geometric Distortion

Acronym	Definition
H/V	Horizontal/Vertical
HV	High Voltage
I/O	Input/Output
IC	Integrated Circuit
LED	Light Emitting Diode
MAC	Macintosh
MOFA	Mask Outside Frame Assemble
OCP	Over Current Protection
OP AMP	Operational Amplifier
OSD	On Screen Display
P-P	Peak to Peak
PCB	Printed Circuit Board
PLL	Phase Locked Loop
PWM	Pulse Width Modulation
SMPS	Switch Mode Power Supply
SVGA	Super Video Graphics Array
SWEDAC	
TP	Test Point
UL	Underwriters Laboratories
USB	Universal Serial Bus
VESA	Video Electronics Standard Association
VGA	Video Graphics Array
VR	Variable Registor
W/B	White Balance

3 Product Specifications

3-1 Specifications

Item	Description	
Picture Tube:	15-Inch (38 cm): 13.8-inch (35 cm) viewable, 16-Inch (40 cm): 15.0-inch (38 cm) viewable, 17-Inch (43 cm): 15.7-inch (39.80 cm) viewable, Full-square flat-face tube, 90° Deflection, 0.28 mm Dot pitch, Semi- tint, Non-glare, Invar shadow mask, Anti-static silica coating Conventional type (16"), AK Shadow mask (16")	
Scanning Frequency	Horizontal : 30 kHz to 70 kHz (Automatic) Vertical : 50 Hz to 160 Hz (Automatic)	
Display Colors	Unlimited colors	
Maximum Resolution	Horizontal : 1280 Dots Vertical : 1024 Lines	
Input Video Signal	Analog, 0.714 Vp-p positive at 75 Ω, internally terminated	
Input Sync Signal	Separate Sync : TTL level positive/negative	
Maximum Pixel Clock rate	110 MHz	
Active Display	CHB5**7L ; Horizontal : 267 mm ± 3 mm, Vertical : 200 mm ± 3 mm CHB6**7L : Horizontal : 290 mm ± 3 mm, Vertical : 217.5 mm ± 3 mm CHB7**7L ; Horizontal : 306 mm ± 3 mm (4:3 ratio), Vertical : 230 mm ± 3 mm	
Input Voltage	AC 90 to 264 Volts, 60 Hz or 50 Hz ± 3 Hz	
Power Consumption	80 Watt (max) : 15"/16", 90 Watt (max) : 17"	
Dimensions	Unit (W x D x H)	Carton (W x D x H)
CHB5**7L	14.3 x 15.4 x 14.8 Inches (362 x 390 x 377 mm)	17.9 x 19.6 x 17.5 Inches (454 x 497 x 445 mm)
CHB6**7L	15.6 x 16.7 x 16.1 Inches (395 x 425 x 401 mm)	20.2 x 21.6 x 20.7 Inches (513 x 548 x 527 mm)
CHB7**7L	16.5 x 16.7 x 16.6 Inches (420 x 425 x 421 mm)	21.0 x 21.7 x 21.3 Inches (534 x 552 x 541 mm)
Weight (Net/Gross)	CHB5**7L : 27.94 lbs (12.7 kg) / 31.90 lbs (14.5 kg) CHB6**7L : 32.63 lbs (14.8 kg) / 37.04 lbs (116.8 kg) CHB7**7L : 36.38 lbs (16.5 kg) / 41.89 lbs (19 kg)	
Environmental Considerations	Operating Temperature : 32°F to 104°F (0°C to 40°C) Humidity : 10 % to 80 % Storage Temperature : -4°F to 113°F (-20°C to 45°C) Humidity : 5 % to 95 %	
Speaker System Specifications (Optional)	• Output Power : 3 Watt/CH (THD 10%) • Speaker Drivers : 2 Inch Neodynium • Impedance (System) : 4 ohm ± 15% • S/N Ratio : 50 dB • Accessory : Two (2) Stereo Cable • Frequency Response : 240 Hz – 15,000 Hz • Input Level : 500 mV ± 50 mV • Power Supply : from Monitor 12V 1A • Net : 1.7 lbs (770g) • Dimensions : 10.2" (D) x 10.8" (W) x 3.3" (H)	

- Above models comply with SWEDAC (MPR II) recommendations for reduced electromagnetic fields.
- Designs and specifications are subject to change without prior notice.

3-2 Pin Assignments

Sync Type / Pin No.	15-Pin Signal Cable Connector (Figure 3-1)	Cable Adapter (Figure 3-2)
	Separate	Macintosh
1	Red	GND-R
2	Green	Red
3	Blue	H/V Sync
4	GND	Sense 0
5	DDC Return	Green
6	GND-R	GND-G
7	GND-G	Sense 1
8	GND-B	Reserved
9	Reserved	Blue
10	GND-Sync/Self-raster	Sense 2
11	GND	GND
12	DDC Data	V-Sync
13	H-Sync	GND-B
14	V-Sync	GND
15	DDC Clock	H-Sync

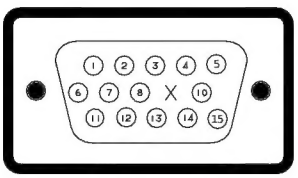


Figure 3-1. Male Type

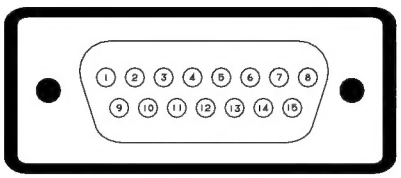


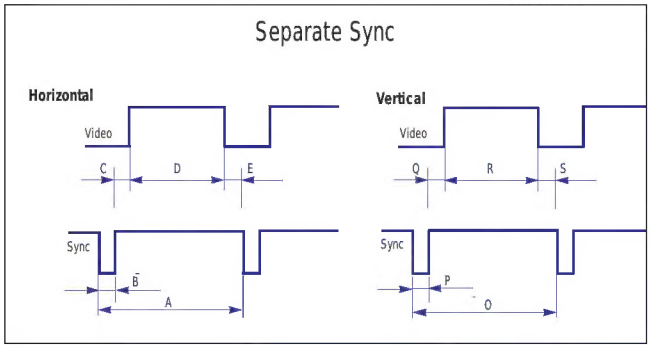
Figure 3-2. Male Type

3-3 Timing Chart

This section of the service manual describes the timing that the computer industry recognizes as standard for computer-generated video signals.

Table 3-1. Timing Chart

Mode / Timing	IBM		VESA					
	VGA2/70 Hz 720 x 400	VGA3/60 Hz 640 x 480	640/75 Hz 640 x 480	640/85 Hz 640 x 480	800/75 Hz 800 x 600	800/85 Hz 800 x 600	1024/75 Hz 1024 x 768	1024/85 Hz 1024 x 768
fH (kHz)	31.469	31.469	37.500	43.269	46.875	53.674	60.023	68.677
A µsec	31.777	31.778	26.667	23.111	21.333	18.631	16.660	14.561
B µsec	3.813	3.813	2.032	1.556	1.616	1.138	1.219	1.016
C µsec	1.907	1.907	3.810	2.222	3.232	2.702	2.235	2.201
D µsec	25.422	25.422	20.317	17.778	16.162	14.222	13.003	10.836
E µsec	0.636	0.636	0.508	1.556	0.323	0.569	0.203	0.508
fV (Hz)	70.087	59.940	75.000	85.008	75.000	85.061	75.029	84.997
O msec	14.268	16.683	13.333	11.764	13.333	11.756	13.328	11.765
P msec	0.064	0.064	0.080	0.671	0.064	0.056	0.050	0.044
Q msec	1.080	1.048	0.427	0.578	0.448	0.503	0.466	0.524
R msec	12.711	15.253	12.800	11.093	12.800	11.179	12.795	11.183
S msec	0.413	0.318	0.027	0.023	0.021	0.019	0.017	0.015
Clock Frequency (M Hz)	28.322	25.175	31.500	49.500	36.000	56.250	78.750	94.500
Polarity H.Sync	Negative	Negative	Negative	Negative	Positive	Positive	Positive	Positive
V.Sync	Positive	Negative	Negative	Negative	Positive	Positive	Positive	Positive
Remark	Separate	Separate	Separate	Separate	Separate	Separate	Separate	Separate



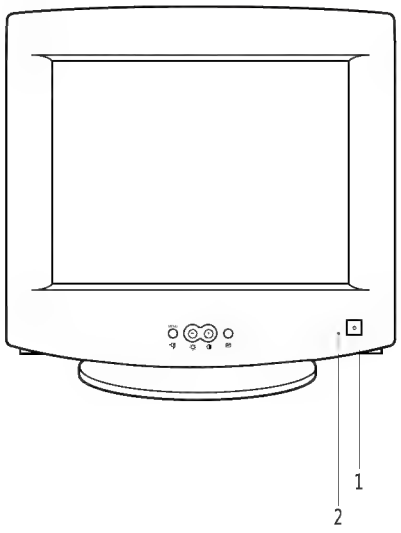
A : Line time total	B : Horizontal sync width	O : Frame time total	P : Vertical sync width
C : Back porch	D : Active time	Q : Back porch	R : Active time
E : Front porch		S : Front porch	

Memo

4 Operating Instructions

4-1 Front View and Control

4-1-1 Front View



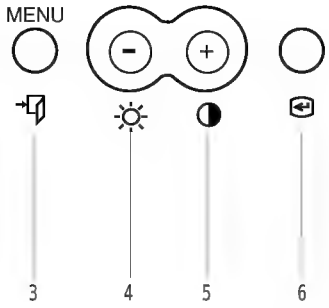


Figure 4-1. Front Control Panel

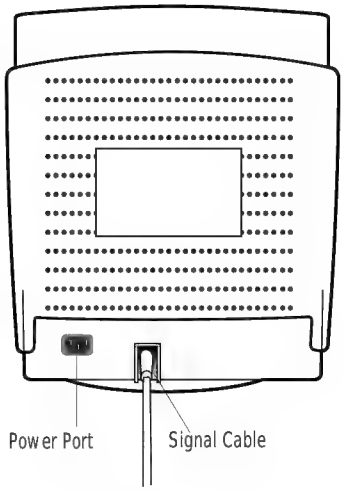


Figure 4-2. Rear View

Table 4-1. Front Panel Controls

Location	Symbol	Description
1		Power Button
2		Power Indicator LED (Dual Color)
3	MENU	Menu Display & Menu Exit
4		Down Button & Brightness
5		Up Button & Contrast
6		Menu Selector Enter Key

Note 1: This monitor requires a cable adapter for use with a Macintosh computer. The MacMaster Cable Adapter supports all monitors and all Macintosh, Centris, Quadra, Duo Dock, and Power Macintosh computers. If you do not already have a cable adapter, check with your computer dealer.

Note 2: When used with a computer equipped with VESA DPMS functions, this monitor is EPA Energy Star compliant and NUTEK compliant.

Table 4-2. Display Power Management Signaling (DPMS)

State / Items	Normal Operation	Power saving function EPA/NUTEK		
		Stand-By Mode	Suspend Mode Position A	Power Off Mode Position B
Horizontal Sync	Active	Inactive	Active	Inactive
Vertical Sync	Active	Active	Inactive	Inactive
Video	Active	Blanked	Blanked	Blanked
Power Indicator	Green	Green Blinking (0.5 sec)	Green Blinking (0.5 sec)	Green Blinking (1 sec)
Power Consumption/hr (17")	90 W (max.) 78 W (nominal)	40 W (nominal)	Less than 15 W	Less than 5 W
Power Consumption/hr (16"/15")	80 W (max.) 70 W (nominal)	40 W (nominal)	Less than 15 W	Less than 5 W

5 Disassembly and Reassembly

This section of the service manual describes the disassembly and reassembly procedures for the CHB5**7L/6**7L/7**7L monitors.

WARNING: This monitor contains electrostatically sensitive devices. Use caution when handling these components.

5-1 Disassembly (CHB7**7L/CHB6**7L)

Cautions: 1. Disconnect the monitor from the power source before disassembly.
2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

5-1-1 Cabinet Disassembly

1. With a pad beneath it, stand the monitor on its front with the screen facing downward and the base close to you. Make sure nothing will damage the screen.
2. Working from the back of the monitor remove the signal cover cap out, and remove the 4 screws and carefully pull the rear cabinet up and off the monitor.
3. Remove the 7 screws on the Top Shield and remove it.
4. Remove the 4 screws on the Bottom Cover and pull it upward to remove it.
5. Using pinch-nosed pliers or long-nosed pliers, carefully disconnect the Anode Cap from the CRT.

5-1-2 Removing the Video PCB & CRT Socket PCB

1. Follow steps 1 through 5 in "Cabinet Disassembly," above.
2. Disconnect connectors CN103.
3. Lift off the CRT Socket PCB Assembly.
4. Hold the CRT Socket PCB Assembly while you lift the cap on the CRT Socket and pull out the two focus wires, G2 wire.
5. Remove both side screws on the lower edge of the Video PCB Ass'y and the screw on the signal connector and pull the assembly towards you to remove it.
6. Remove all screws on the Video PCB Assembly and remove the Video Shield.
7. Lift out the Video PCB and place it on a flat, level surface that is protected from static electricity.

5-1-3 Removing the Main PCB

1. Follow steps 1 through 5 in "Cabinet Disassembly," steps 1 through 7 in "Removing the Video PCB and "Removing the CRT Socket PCB," above.
2. Disconnect the Degaussing Coil at CN600 on the Main PCB.
3. Disconnect all easily accessible ground wires from the CRT GND Assembly and Bottom Chassis.
4. Disconnect the connector between CN_Tilt. on the Main PCB and the Tilt coil.
5. Disconnect the DY connector between the DY and the CN300A_7, CN400, CN401 and CN402 connectors on the Main PCB.
6. Carefully lift the Main PCB Ass'y.
7. Remove the 6 screws on the top side of the Main PCB.
8. Lift the Main PCB and place it on a flat, level surface that is protected from static electricity.

5-1-4 CRT Ass'y Disassembly

1. Complete all previous steps.
2. Remove the 4 side screws 2 on the top and 2 on either side of the CRT and lift the CRT Unit Bracket.
3. Unhook the Degaussing Coil Assembly and lift it off the CRT.
4. Remove the 4 corner screws and lift the CRT up and away from the Front Cover Assembly and place it on a padded surface.

⚠ **Do not lift the CRT by the neck.**

Caution: If you will be returning this CRT to the monitor, be sure to place the CRT face down on a protective pad.

5-2 Disassembly (CHB5**7L)

Cautions: 1. Disconnect the monitor from the power source before disassembly.
2. Follow these directions carefully; never use metal instruments to pry apart the cabinet.

5-2-1 Cabinet Disassembly

1. With a pad beneath it, stand the monitor on its front with the screen facing downward and the base close to you. Make sure nothing will damage the screen.
2. Working from the back of the monitor remove the signal cover cap out, and remove the 4 screws and carefully pull the rear cabinet up and off the monitor.
3. Remove the 4 screws on the Top Shield and remove it.
4.
5. Remove the 4 screws on the Bottom Cover and pull it upward to remove it.
6. Using pinch-nosed pliers or long-nosed pliers, carefully disconnect the Anode Cap from the CRT.

5-2-2 Removing the Video PCB & CRT Socket PCB

1. Follow steps 1 through 5 in "Cabinet Disassembly," above.
2. Disconnect connectors CN103.
3. Lift off the CRT Socket PCB Assembly.
4. Hold the CRT Socket PCB Assembly while you lift the cap on the CRT Socket and pull out the two focus wires, G2 wire.
5. Remove both side screws on the lower edge of the Video PCB Ass'y and the screw on the signal connector and pull the assembly towards you to remove it.
6. Remove all screws on the Video PCB Assembly and remove the Video Shield.
7. Lift out the Video PCB and place it on a flat, level surface that is protected from static electricity.

5-2-3 Removing the Main PCB

1. Follow steps 1 through 5 in "Cabinet Disassembly," steps 1 through 7 in "Removing the Video PCB and "Removing the CRT Socket PCB," above.
2. Disconnect the Degaussing Coil at CN600 on the Main PCB.
3. Disconnect all easily accessible ground wires from the CRT GND Assembly and Bottom Chassis.
4. Disconnect the connector between CN_Tilt. on the Main PCB and the Tilt coil.
5. Disconnect the DY connector between the DY and the CN300A_7, CN400, CN401 and CN402 connectors on the Main PCB.
6.
7. Remove the 8 screws on the top side of the Main PCB.
8. Lift the Main PCB and place it on a flat, level surface that is protected from static electricity.

6 Alignment and Adjustments

This section of the service manual explains how to make permanent adjustments to the monitor. Directions are given for adjustments using the monitor Interface Board Ver. 2.0 and software (SoftJig).

6-1 Adjustment Conditions

Caution: Changes made without the SoftJ ig are saved only to the user mode settings. As such, the settings are not permanently stored and may be inadvertently deleted by the user.

6-1-1 Before Making Adjustments

6-1-1 (a) ORIENTATION

When servicing, always face the monitor to the east.

6-1-1 (b) MAGNETIC FIELDS

Whenever possible, use magnetic field isolation equipment such as a Helmholtz field to surround the monitor. If a Helmholtz field is not available, frequently degauss the unit under test.

Caution: Other electrical equipment may cause external magnetic fields which may interfere with monitor performance.

Use an external degaussing coil to limit magnetic build up on the monitor. If an external degaussing coil is not available, use the internal degaussing circuit. However, do not use the internal degaussing circuit more than once per 30 minutes.

6-1-1 (c) WARM-UP TIM E

The monitor must be on for 30 minutes before starting alignment. Warm-up time is especially critical in color temperature and white balance adjustments.

6-1-1 (d) SIGNAL

Analog, 0.714 Vp-p positive at 75 ohm, internal termination
Sync: Separate
(TTL level negative/positive)

6-1-1 (e) SCANNING FREQUENCY

Horizontal: 30 kHz to 70 kHz (Automatic)
Vertical: 50 Hz to 160 Hz (Automatic)

Unless otherwise specified, adjust at the 16"/17": 1024 x 768 mode (68 kHz/85 Hz), 15": 800 x 600 mode (54 kHz/85 Hz) signals.

Refer to Table 3-1 on page 3-3.

6-1-2 Required Equipment

The following equipment may be necessary for adjustment procedures:

6-1-2 (a) DISPLAY CONTROL ADJ USTM ENT

1. Non-metallic (–) screwdriver: 1.5 mm
   Non-metallic (–) screwdriver: 3 mm
2. Philips (+) screwdriver: 1.5 mm
3. Non-metallic hexkey: 2.5 mm
4. Digital Multimeter (DMM), or
   Digital Voltmeter (DVM)
5. Signal generator, or
   Computer with a video board that uses the ET-4000 chipset (strongly recommended if using Samsung DM 200 software) and that displays: 1024 x 768 @ 85 Hz, or 800 x 600 @ 85 Hz (minimum).
6. Personal computer
7. Required software: Softjig.exe from Samsung which includes the cg17e.c data file Samsung DM200, or DisplayMate for Windows from Sonera Technologies
8. Interface Board Ver. 2.0 Code No. BH81-90001K
9. Parallel communications cable (25-pin to 25-pin); Code No. BH81-90001H
10. Signal cable (15-pin to 15-pin cable with additional 3-pin connector); Code No. BH81-90001J
11. 5 V DC adapter, not supplied

Note: SoftJig Ass'y (includes items 8, 9 and 10) Code No. BH81-90001L

6-1-2 (b) COLOR ADJ USTM ENTS

1. All equipment listed in 6-1-2 (a), above
2. Color analyzer, or any luminance measurement equipment

6-1-3 Connecting the SoftJig

Connect the monitor to the signal generator and/or PC as illustrated in Figures 6-1 and 6-2.

Note: The signal cable connector which includes the 3-wire cable must connect to the monitor. If you use Setup 2 (PC only, no signal generator) you can only make adjustments to the signal timing available on that computer system. To make corrections to all factory timings requires the use of an additional signal generator.

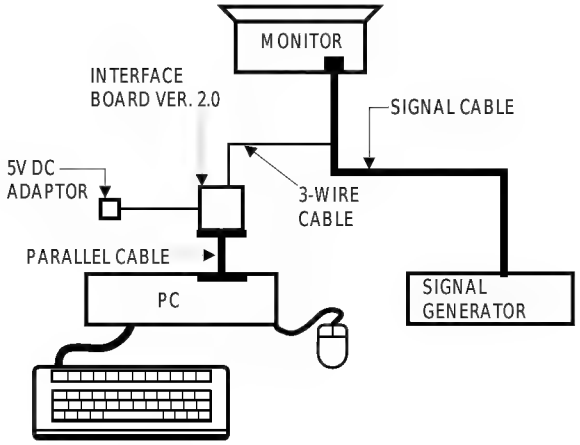


Figure 6-1. Setup 1, With Signal Generator

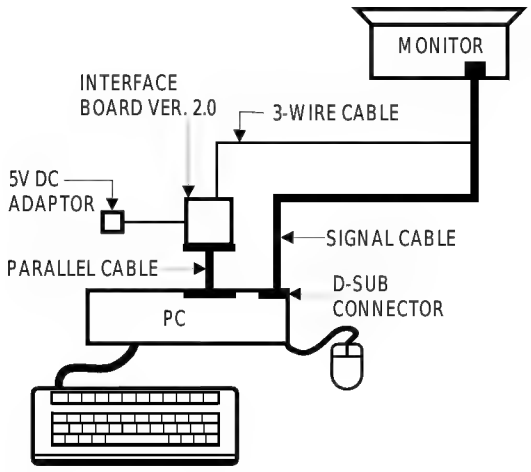


Figure 6-2. Setup 2, Without Signal Generator

6-1-4 After Making Adjustments

After finishing all adjustments, test the monitor in all directions. If, for example, the monitor does not meet adjustment specifications when facing north, reposition the monitor to face east and readjust. This time, try for an adjustment closer to the ideal setting within the tolerance range. Test the unit again in all directions. If the monitor again fails to meet specifications in every direction, contact your Regional After Service Center for possible CRT replacement.

6-1-5

6-1-5 (a) HIGH VOLTAGE ADJUSTMENT

Signal:	No signal
Display image:	Self raster
Contrast:	Maximum
Brightness:	Maximum
Limit:	26 kV ± 0.2 kV (17″)
	25 kV ± 0.2 kV (15″/16″)

Measure the high voltage level at the anode cap. High voltage should be within the limit as above. If the high voltage needs adjustment use the following procedure.

PROCEDURE

1. Increase or decrease **HFV** to adjust the high voltage to limit.
2. Click factory save.

6-1-5 (b) G2 (SCREEN) VOLTAGE ADJUSTMENT

Signal:	No signal
Display image:	Self raster
Contrast:	Maximum
Brightness:	Maximum

Adjust the Screen VR of the FBT so that the G2 (Screen) Voltage
for 17″
SDD CRT: 470 V ± 10 V, TSB CRT: 630 V ± 10 V
for 16″
SDD CRT: 410 V ± 10 V
for 15″
SDD CRT: 560 V ± 10 V, TSB CRT: 630 V ± 10 V.

6-1-5 (c) CENTER RASTER

Adjust SW451 so that the back raster comes to the center when you apply a signal of 60 kHz/75 Hz.

6-2 Display Control Adjustments

6-2-1 Centering

Centering means to position the center point of the display in the middle of the display area. Horizontal size and position and vertical size and position control the centering of the display.

Adjust the horizontal size and vertical size to their optimal settings: 306 mm (H) x 230 mm (V) for 17", 290 mm (H) x 217.5 mm (V) for 16", 267 mm (H) x 200 mm (V) for 15".

Adjust the horizontal position and vertical position to ≤ 4.0 mm of the center point of the screen.

| A-B | ≤ 4.0 mm. | | C-D | ≤ 4.0 mm.

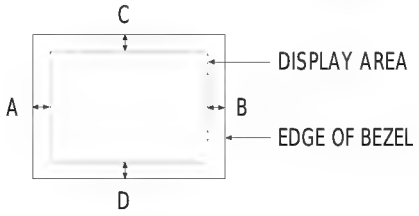


Figure 6-3. Centering

6-2-1 (a) HORIZONTAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Click on the << or >> box next to **B+OUT** to adjust the horizontal size of the display pattern to 306 mm (17"), 290 mm (16") and 267 mm (15"). (Tolerance: ± 3 mm.)

6-2-1 (b) VERTICAL SIZE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Click on the << or >> box next to **V_SIZE** to adjust the vertical size of the display pattern to 230 mm (17"), 217.5 mm (16") and 200 mm (15"). (Tolerance: ± 3 mm.)

6-2-1 (c) HORIZONTAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Crosshatch pattern

Click on the << or >> box next to **H_POSI** to center the horizontal image on the raster.

6-3-1 (d) VERTICAL POSITION ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Crosshatch pattern

Click on the << or >> box next to **V_POSI** to center the vertical image on the raster.

6-2-2 Linearity

Linearity affects the symmetry of images as they appear on the screen. Unless each row or column of blocks in a crosshatch pattern is of equal size, or within the tolerances shown in Tables 6-2 and 6-3, an image appears distorted, elongated or squashed.

Table 6-1. Standard Modes Linearity: 640x480/75Hz, 800x600/85Hz and 1024x768/85Hz

	Standard Modes Linearity	
	Each block (10 %)	Difference between adjacent blocks (4 %)
4 : 3	Horizontal: 18.2~20.1 Vertical : 18.2~20.1	Horizontal: Less than 0.77 mm Vertical : Less than 0.77 mm
5 : 4	Horizontal: 17.1~18.9 Vertical : 18.2~20.1	Horizontal: Less than 0.72 mm Vertical : Less than 0.77 mm

Table 6-2. Other Modes Linearity: VGA, SVGA, XGA, MAC, etc.

	Supported Timing Mode	
	Each block (10 %)	Difference between adjacent blocks (5 %)
4 : 3	Horizontal: 17.8~20.5 Vertical : 17.8~20.5	Horizontal: Less than 0.96 mm Vertical : Less than 0.96 mm
5 : 4	Horizontal: 16.7~19.2 Vertical : 17.8~20.5	Horizontal: Less than 0.90 mm Vertical : Less than 0.96 mm

6-2-2 (a) HORIZONTAL LINEARITY ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

To adjust the Horizontal Linearity, refer to Tables 6-1 and 6-2 for the tolerance range.

Increase or decrease **H_LIN** to optimize the image.

6-2-2 (b) VERTICAL LINEARITY ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

To adjust the Vertical Linearity, refer to Tables 6-1 and 6-2 for the tolerance range.

Increase or decrease **V_LIN** to optimize the image.

6-2-3 Trapezoid Adjustment

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Increase or decrease **TRAPE** to make the image area rectangular.

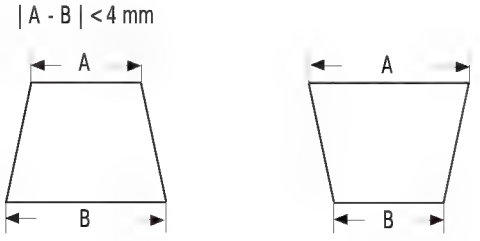


Figure 6-4. Trapezoid

6-2-4 Pinbalance Adjustment

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

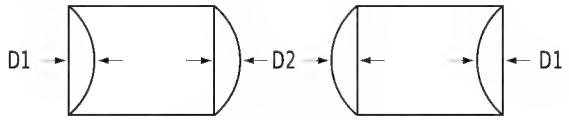


Figure 6-5. Pinbalance

Increase or decrease **PIN_BAL** to optimize the image.

6-2-5 Parallelogram Adjustment

CONDITIONS

Scanning Frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Increase or decrease **PARALL** to make the image area rectangular.

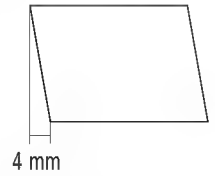


Figure 6-6. Parallelogram

6-2-6 Side Pincushion Adjustment

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern

Increase or decrease **BARREL** to straighten the sides of the image area.

| C1 |, | C2 | ≤ 2.0 mm, | D1 |, | D2 | ≤ 2.0 mm.

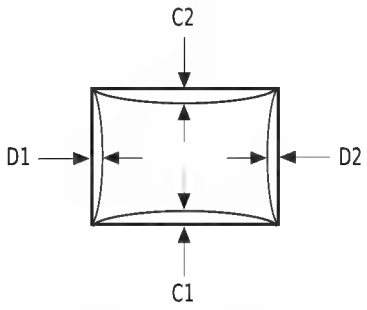


Figure 6-7. Pincushion

6-2-7 Tilt Adjustment

CONDITIONS

Scanning Frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Crosshatch pattern
Brightness:	Maximum
Contrast:	Maximum

Increase or decrease **ROTATE** to correct the tilt of the display.

6-2-8 Degauss

No adjustments are available for the degaussing circuit. The degaussing circuit can effectively function only once per 30 minutes.

6-2-9 To Delete the User Mode Data

To delete the adjustment data from the user modes, click **USER DELETE.**

6-2-10 Save the Data

To save the adjustment data for a mode, press **FACTORY SAVE**.

6-3 Color Adjustments

6-3-1 Color Coordinates (Temperature)

Color temperature is a measurement of the radiant energy transmitted by a color. For computer monitors, the color temperature refers to the radiant energy transmitted by white. Color coordinates are the X and Y coordinates on the chromaticity diagram of wavelengths for the visible spectrum.

CONDITIONS

Measurement instrument:	Color analyzer
Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	White flat field at center of display area
Luminance:	Maximum

PROCEDURE

Use the directions in sections 6-3-2 through 6-3-3 to adjust the color coordinates for:
9300K to x = 0.283 ± 0.02, y = 0.298 ± 0.02
6500K to x = 0.313 ± 0.02, y = 0.329 ± 0.02

6-3-2 Color Adjustments for 9300K

6-3-2 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Back raster pattern
Brightness:	Maximum
Contrast:	Maximum

1. Select **COLOR CHANNEL 1** to control the color for 9300K.
2. Adjust the luminance of the back raster to between 0.5 to 0.7 ft-L using the **G_CUT** controls.
3. Increase or decrease **B_CUT** to set the "y" coordinate to 0.298 ± 0.02.
4. Increase or decrease **R_CUT** to set the "x" coordinate to 0.283 ± 0.02.

6-3-2 (b) G-GAIN ADJUSTMENT

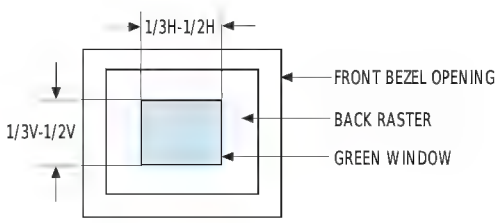


Figure 6-8. Green Box Pattern

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Green box pattern
Brightness:	Maximum
Contrast:	Maximum

1. Increase or decrease **G_GAIN** to adjust the brightness of the Green Gain to 40 ± 1 ft-L. (only 17″ S-2 CDT : 37 ft-L)

   Note: If you can't increase the Green Gain to the appropriate value, click on the >> box next to increase the **ABL** point.

6-3-2 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

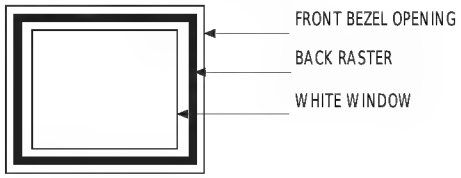


Figure 6-9. Full White Pattern

1. Increase or decrease **R_GAIN** and **B_GAIN** to make the video white.
   (For 9300K color adjustment:
   x = 0.283 ± 0.02, y = 0.298 ± 0.02.)

   Note: Do not touch the **G_GAIN** controls.
2. Check the ABL. If it is not within the specifications (37 ± 1 ft-L), use the ABL controls to adjust it.
   (17" S-2 CDT: 35 ft-L, 16" CDT 33 ft-L)
3. Select **COLOR FACTORY SAVE** to save the data.
4. Select **ALL MODE SAVE** to save the CH2.

6-3-2 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Back raster pattern
X-Y Coordinates:	x = 0.283 ± 0.02, y = 0.298 ± 0.02
ABL Luminance	35 ± 1 ft-L 33 ± 1 ft-L (16" CDT)
Brightness:	Maximum
Contrast:	Maximum

1. Check whether the color coordinates of the back raster satisfy the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.
2. Display a full white pattern.

Note: Do not touch the **G_GAIN** controls.

3. Adjust the Contrast Control on the monitor so that the luminance of the video is about 5 ft-L.
4. Check whether the white coordinates of the video meet the above coordinates spec.
5. Adjust the Contrast Control again so that the luminance of the video is about 24 ft-L.
6. Check whether the white coordinates of the video satisfies the above spec.

   If they do not, return to 6-3-2 (a) and readjust all settings.

6-3-3 Color Adjustments for 6500K

6-3-3 (a) BACK RASTER COLOR ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Back raster pattern
Brightness:	Maximum
Contrast:	Maximum

1. Select **COLOR CHANNEL 2** to control the color for 6500K.
2. Adjust the luminance of the back raster to between 0.5 to 0.7 ft-L using the **G_CUT** controls.

Note: For 6500K adjustments you must not change the Screen VR of the FBT. To do so changes the 9300K setting values.

3. Increase or decrease **R_CUT** and **B_CUT** to adjust the R-Bias to x = 0.313 ± 0.02 and the B-Bias to y = 0.329 ± 0.02.

6-3-3 (b) G-GAIN ADJUSTMENT

This procedure is the same as that for 9300K, refer to the procedure on page 6-6.

6-3-3 (c) WHITE BALANCE ADJUSTMENT

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17"/16") 54 kHz/85 Hz (15")
Display image:	Full white pattern
Brightness:	Maximum
Contrast:	Maximum

1. Increase or decrease **R_GAIN** and **B_GAIN** to make the video white.
   (For 6500K color adjustment:
   x = 0.313 ± 0.02, y = 0.329 ± 0.02.)
2. Refer to the procedure for 9300K, section 6-3-2 (c) steps 2 and 3.

6-3-3 (d) WHITE BALANCE ADJUSTMENT VERIFICATION

Refer to the procedure for 9300K, section 6-3-2 (d).

6-3-4 Luminance Uniformity Check

Luminance is considered uniform only if the ratio of lowest to highest brightness areas on the screen is not less than 7.5:10.

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″) (1024 x 768)
Display image:	White flat field
Brightness:	Cut off point at 24 ft-L
Contrast:	Maximum

PROCEDURE

Measure luminance at nine points on the display screen (see figure below).

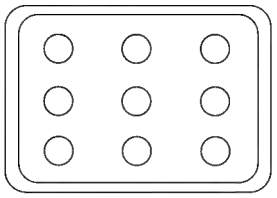


Figure 6-10. Luminance Uniformity Check Locations

6-3-5 Focus Adjustment

CONDITIONS

Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″) (1024 x 768)
Display image:	"H" character pattern
Brightness:	Cut off point
Contrast:	Maximum

PROCEDURE

1. Adjust the Focus VR on the FBT to display the sharpest image possible.
2. Use Locktite to seal the Focus VR in position.

6-3-6 Color Purity Adjustment

Color purity is the absence of undesired color. Conspicuous mislanding (unexpected color in a uniform field) within the display area shall not be visible at a distance of 50 cm from the CRT surface.

CONDITIONS

Orientation:	Monitor facing east
Scanning frequency:	68 kHz/85 Hz (17″/16″) 54 kHz/85 Hz (15″)
Display image:	White flat field
Luminance:	Cut off point at the center of the display area

Note: Color purity adjustments should only be attempted by qualified personnel.

PROCEDURE

For trained and experienced service technicians only.

Use the following procedure to correct minor color purity problems:

1. Make sure the display is not affected by external magnetic fields.
2. Very carefully break the glue seal between the 2-pole purity convergence magnets (PCM), the band and the spacer (see Figures 6-12).
3. Make sure the spacing between the PCM assembly and the CRT stem is 29 mm ± 1 mm.
4. Display a green pattern over the entire display area.
5. Adjust the purity magnet rings on the PCM assembly to display a pure green pattern. (Optimum setting: x = 0.295 ± 0.015, y = 0.594 ± 0.015)
6. Repeat steps 4 and 5 using a red pattern and then again, using a blue pattern.

Table 6-3. Color Purity Tolerances

Red:	x = 0.640 ± 0.015	y = 0.323 ± 0.015
Green:	x = 0.295 ± 0.015	y = 0.594 ± 0.015
Blue:	x = 0.142 ± 0.015	y = 0.066 ± 0.015

(For 9300K color adjustment: x = 0.283 ± 0.02, y = 0.298 ± 0.02)

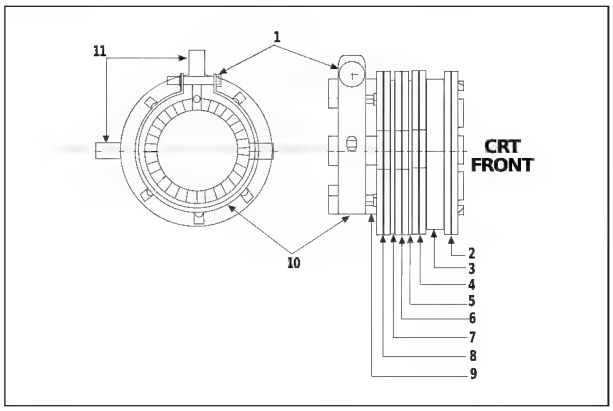
7. When you have the PCMs properly adjusted, carefully glue them together to prevent their movement during shipping.

6-4 Convergence Adjustments

Misconvergence occurs when one or more of the electron beams in a multibeam CRT fail to meet the other beams at a specified point.

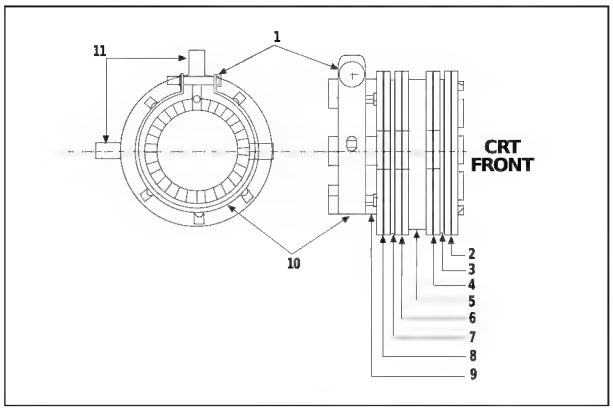
Table 6-4. Misconvergence Tolerances

Position	Error in mm	CRT Dot Pitch
Circle (A)	0.25	0.28
Circle (B)	0.3	0.28
Edge (C)	0.35	0.28



Samsung SDD CRT			
1 Setup Bolt	2 Bow Magnet	3 Band	4 2-Pole Magnet
5 Spacer	6 4-Pole Magnet	7 Spacer	8 6-Pole Magnet
9 Holder	10 Band	11 Tabs	

Figure 6-11. Magnet Configuration



Toshiba CRT			
1 Setup Bolt	2 Bow Magnet	3 Spacer	4 2-Pole Magnet
5 Band	6 6-Pole Magnet	7 Spacer	8 4-Pole Magnet
9 Holder	10 Band	11 Tabs	

Figure 6-12. Toshiba Magnet Configuration

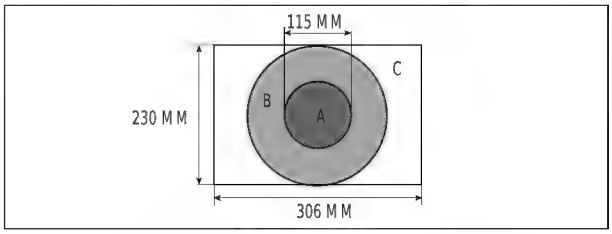


Figure 6-13. Convergence Measurement Areas

6-4-1 Static (Center) Convergence

Static convergence involves alignment of the red, blue and green lines in the center area of the display. See "Dynamic Convergence" for alignment of the color fields around the edges of the display.

CONDITIONS

Direction: Monitor facing east
Warm-up: 30 minutes
Display image: Crosshatch pattern
Tolerances: See Table 6-4

PROCEDURE

As shown in Figure 6-11, the CRT used in these monitors has the same magnet configuration as shown in Table 6-5 below.

Table 6-5. Magnet Order

CRT Manufacturer	Magnet Order from Front of CRT
SDD	Convergence bow, 2-pole, 4-pole, 6-pole
Toshiba	Convergence bow, 2-pole, 6-pole, 4-pole

Use the following steps to correct any static misconvergence:

1. Make sure the display is not affected by external magnetic fields.
2. Locate the pair of 4-pole magnet rings.
3. Unlock the rings and rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue lines.
4. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue lines.

5. After completing the red and blue center convergence adjustment, locate the pair of 6-pole magnet rings.
6. Rotate the individual rings (change the spacing between tabs) to converge the vertical red and blue (magenta) and green lines.
7. Rotate the pair of rings (maintaining the spacing between tabs) to converge the horizontal red and blue (magenta) and green lines. Don't rotate the 2-pole magnets as they adjust for color purity.
8. Mark the correct position for the magnets and apply a small line of glue to hold the magnets in place. Lock the rings in place.

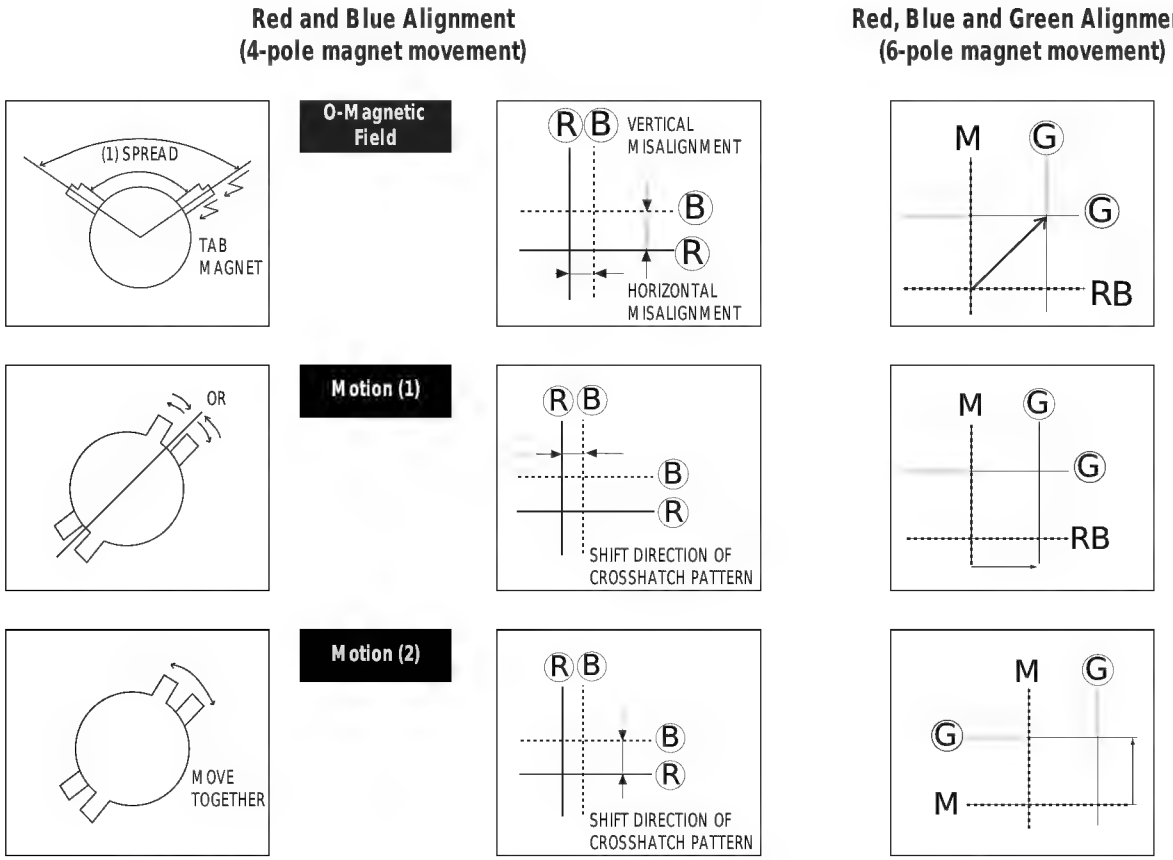
6-4-2 Dynamic (Edge) Convergence

Use the following procedure to correct minor dynamic (edge) misconvergence. If, after using this procedure, dynamic misconvergence around the periphery of the display area is still greater than the tolerance, contact the Regional After Service Center for possible CRT replacement.

1. Make sure the display is not affected by external magnetic fields.
2. Make sure the static convergence is properly adjusted.
3. Strategically place small rubber magnets on the back of the CRT to correct the misconvergence. Be careful not to remove the paper protecting the adhesive on the magnets until you are satisfied with their placement and the dynamic convergence.
4. When you are satisfied with the convergence around the edge of the CRT, permanently glue the magnets to the back of the CRT.

WARNING: Do not remove or change the position of the factory installed wedges. These wedges were installed by the CRT manufacturer and are properly placed for this CRT; their removal may result in damage to the CRT.

Figure 6-14. Magnet Movements



6-4-3 Bow Convergence Adjustments

CONDITIONS

Orientation: Monitor facing east.
Display Image: Crosshatch pattern with mixed RGB colors.
Required tools: Flat-head (–) screwdriver, 1.5 mm
Philips (+) screwdriver, 1.5 mm
Hexkey, 2.5 mm

PROCEDURE

Bow convergence adjustments are not available for the CRTs used in the CHB5**7L/6**7L/7**7L monitors. While all CRTs have bow convergence magnets, they are sealed in the CRT factory and are not user or service technician adjustable. Do not touch these magnets (see Figures 6-12 and 6-13). If bow convergence adjustment is out of alignment, replace the CRT.

Bow misconvergence should not exceed the values listed in Table 6-5: Misconvergence Tolerances.

6-4-4 Balance Convergence Adjustments

Balance Convergence involves alignment of red and blue lines when they are misaligned at one end more so than at the other end. The Deflection Yoke holds the balance coils which can correct balance misconvergences.

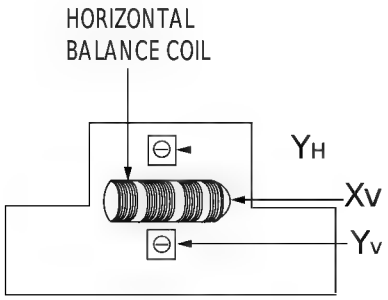


Figure 6-15. SDD Deflection Yoke

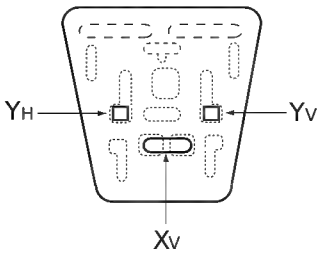


Figure 6-16. Toshiba Deflection Yoke

6-4-4 (a) HORIZONTAL LINE RED AND BLUE BALANCE CONVERGENCE

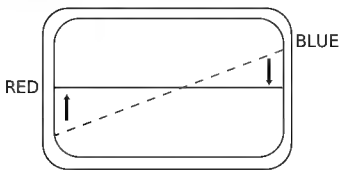


Figure 6-17. Horizontal Line Balance Misconvergence

Use a 2.5 mm hexkey at the Horizontal Balance Coil (XV). Turning it right raises the right end of the blue line and lowers the left end. Turning the VR to the left lowers the right end of the blue line and raises the left end.

6-4-4 (b) VERTICAL RED AND BLUE BALANCE CONVERGENCE

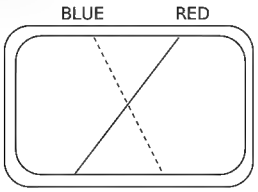


Figure 6-18. Vertical Line Balance Misconvergence

Use a 1.5 mm screwdriver (flat-head [–] for SDD DYs and phillips type [+] for Toshiba DYs) at the YH variable register. Turning the VR left tilts the blue line to the right. Turning it right tilts the blue line to the left.

6-4-4 (c) UPPER AND LOWER HORIZONTAL LINE CONVERGENCE

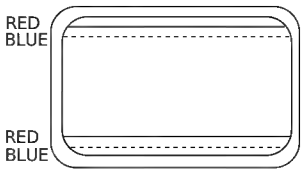


Figure 6-19. Upper and Lower Balance Misconvergence

Use a 1.5 mm screwdriver (flat-head [–] for SDD DYs and phillips type [+] for Toshiba DYs) at the Yv variable register. Turning the VR to the left moves the blue line at the top upward and at the bottom, the line moves downward. Turning it right moves the blue line at the top downward and at the bottom, the line moves upward.

Memo

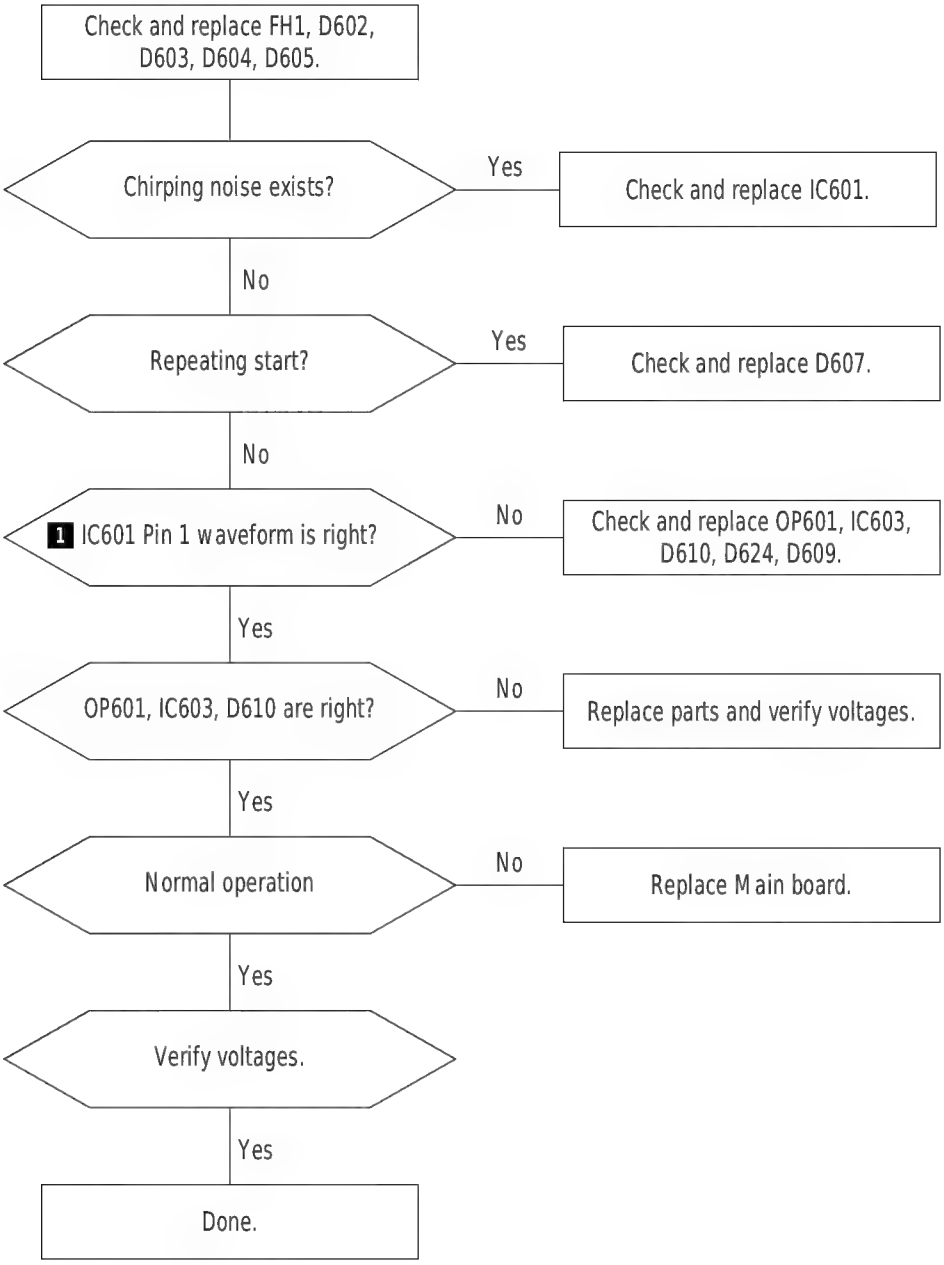
7 Troubleshooting

7-1 Parts Level Troubleshooting

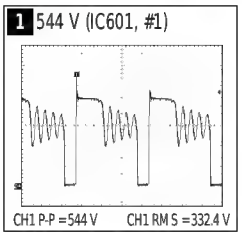
Notes: 1. If a picture does not appear, fully rotate the brightness and contrast controls clockwise and reinspect.

2. Check the following circuits.
   - No raster appears: Power circuit, Horizontal output circuit, H/V control circuit, and H/V output circuit.
   - High voltage develops but no raster appears: Video output circuits.
   - High voltage does not develop: Horizontal output circuits.

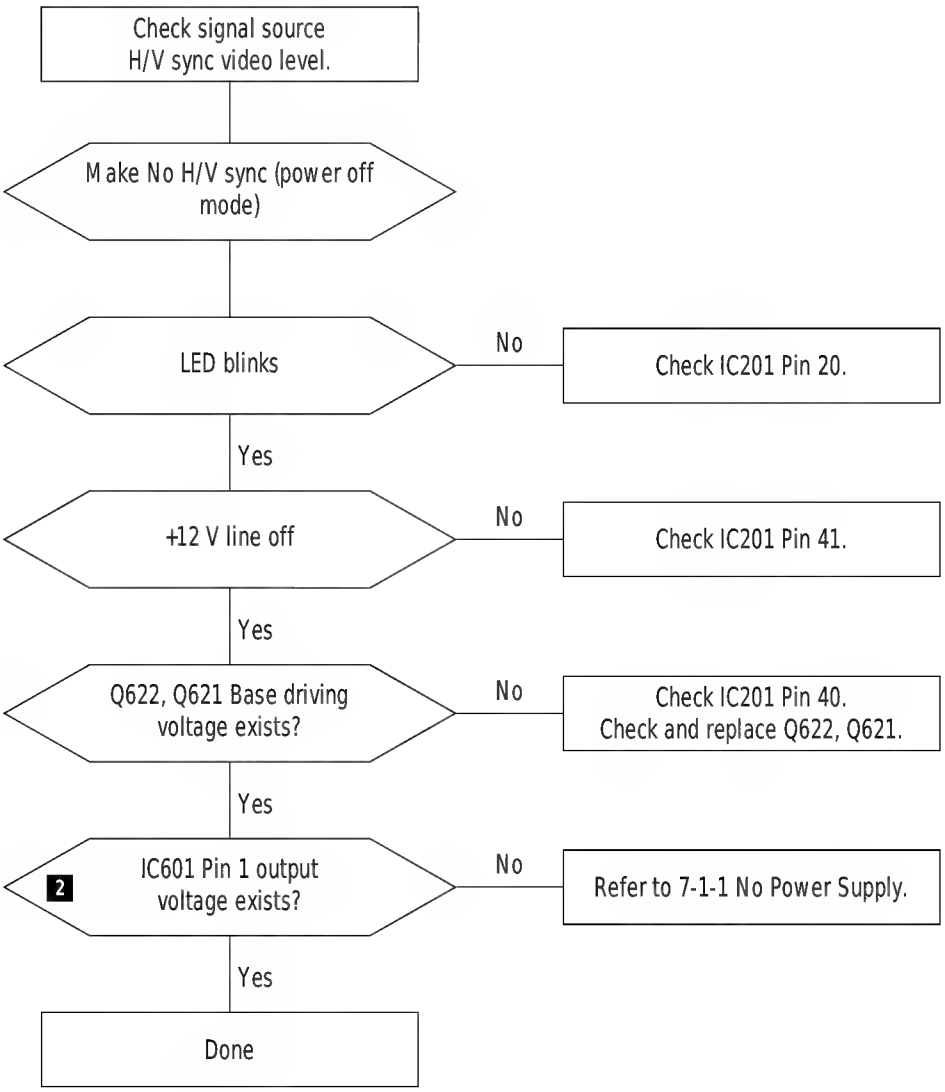
7-1-1 No Power Supply



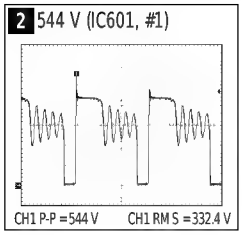
WAVEFORMS



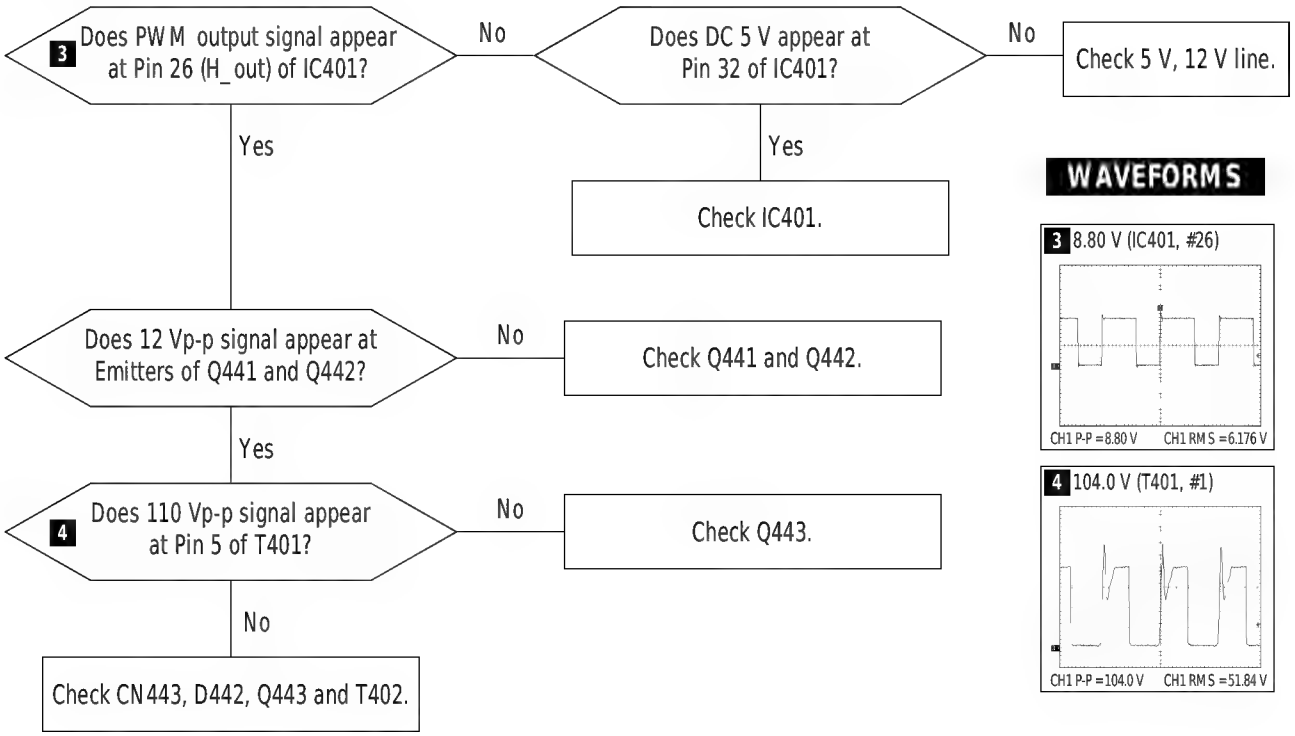
7-1-2 DPMS Failure



WAVEFORMS

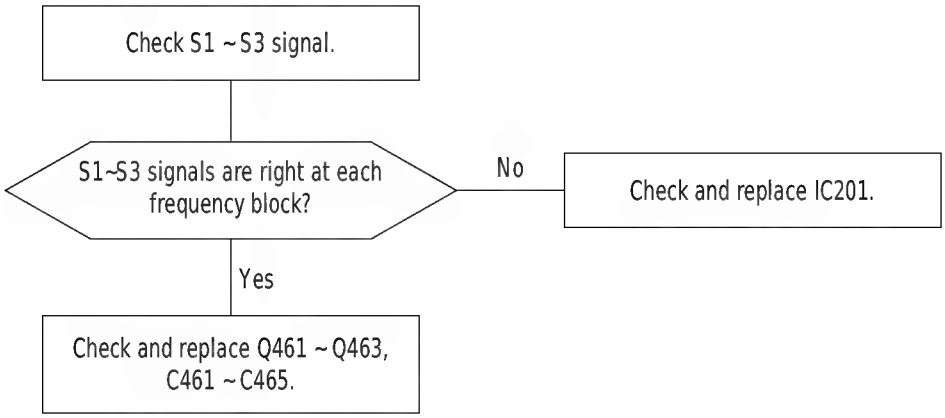


7-1-3 H_Deflection Failure

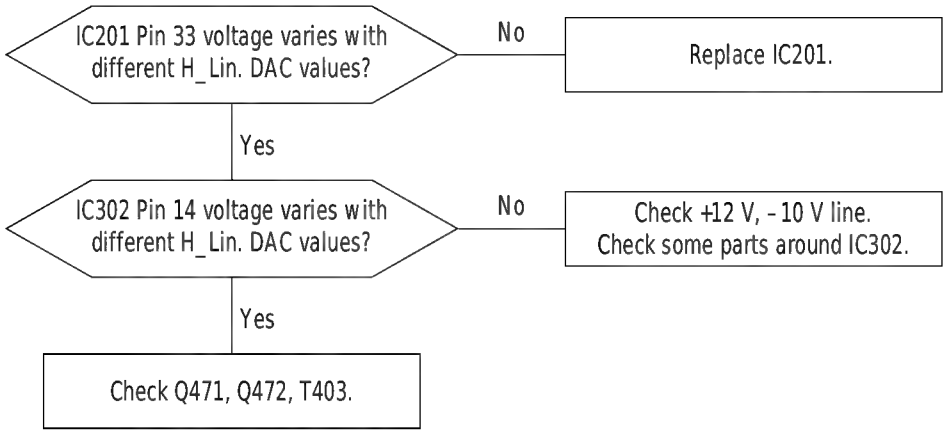

3 Does PWM output signal appear at Pin 26 (H_out) of IC401?
No
Does DC 5 V appear at Pin 32 of IC401?
No
Check 5 V, 12 V line.
Yes
Yes
Check IC401.
Does 12 Vp-p signal appear at Emitters of Q441 and Q442?
No
Check Q441 and Q442.
Yes
4 Does 110 Vp-p signal appear at Pin 5 of T401?
No
Check Q443.
No
Check CN443, D442, Q443 and T402.

WAVEFORMS

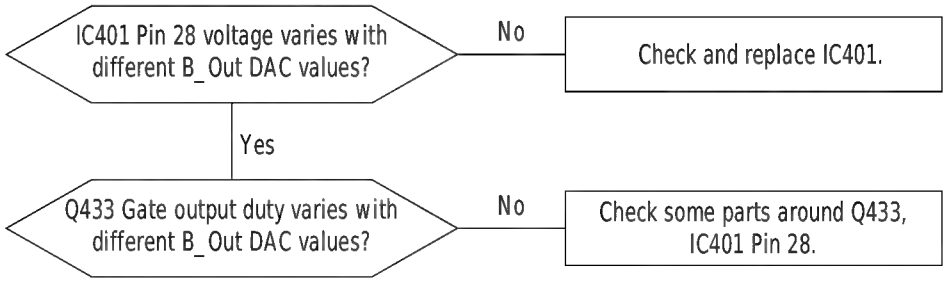
7-1-4 S Correction Failure


Check S1 ~ S3 signal.
S1~S3 signals are right at each frequency block?
No
Check and replace IC201.
Yes
Check and replace Q461 ~ Q463, C461 ~ C465.

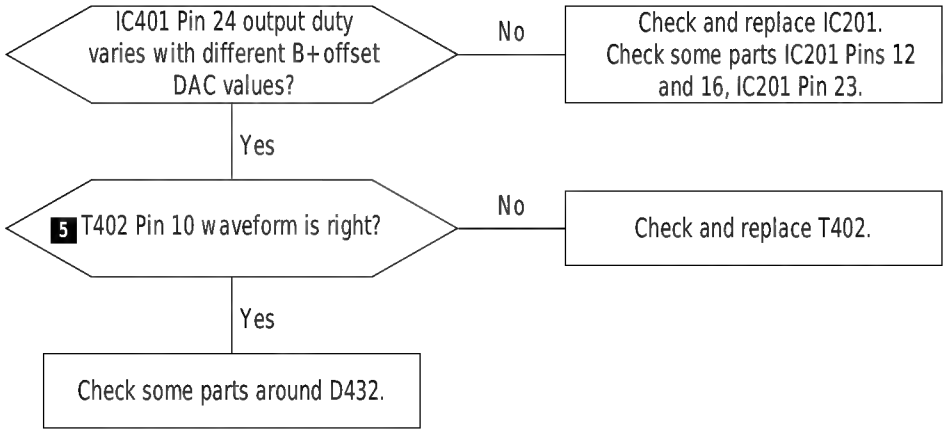
7-1-5 H_Lin. Failure


IC201 Pin 33 voltage varies with different H_Lin. DAC values?
No
Replace IC201.
Yes
IC302 Pin 14 voltage varies with different H_Lin. DAC values?
No
Check +12 V, – 10 V line.
Check some parts around IC302.
Yes
Check Q471, Q472, T403.

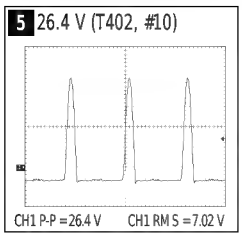
7-1-6 Invariable H_Size


IC401 Pin 28 voltage varies with different B_Out DAC values?
No
Check and replace IC401.
Yes
Q433 Gate output duty varies with different B_Out DAC values?
No
Check some parts around Q433, IC401 Pin 28.

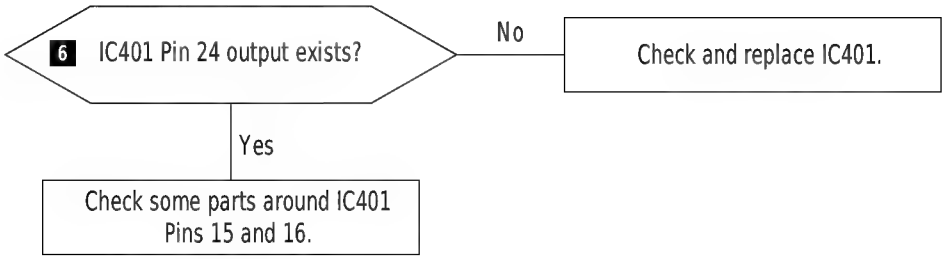
7-1-7 Abnormal H_Size


IC401 Pin 24 output duty varies with different B+offset DAC values?
No
Check and replace IC201.
Check some parts IC201 Pins 12 and 16, IC201 Pin 23.
Yes
5 T402 Pin 10 waveform is right?
No
Check and replace T402.
Yes
Check some parts around D432.

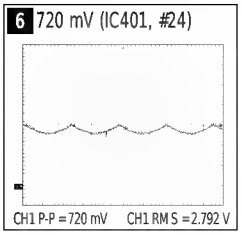
WAVEFORMS



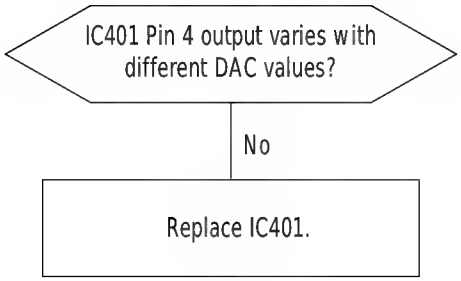
7-1-8 Side Pin or Trap Failure



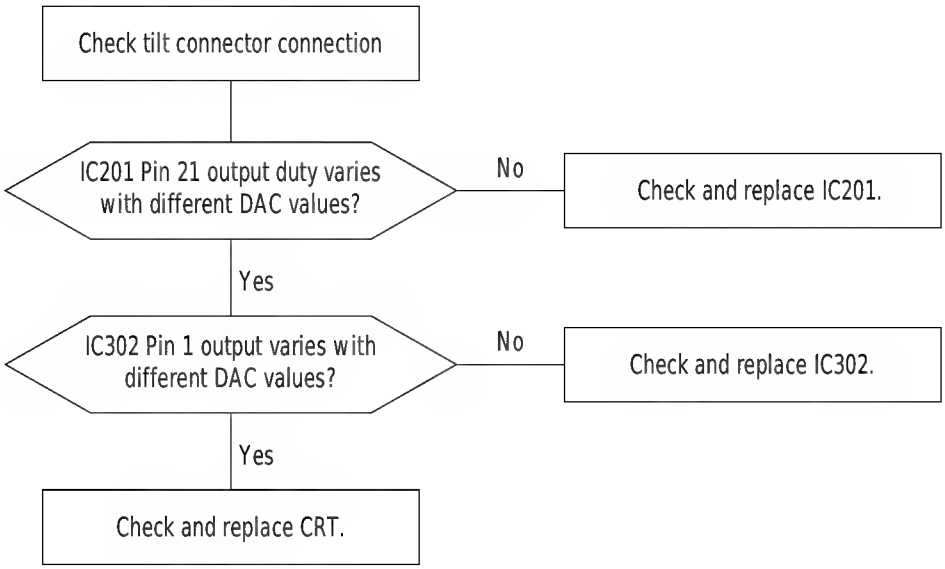
WAVEFORMS



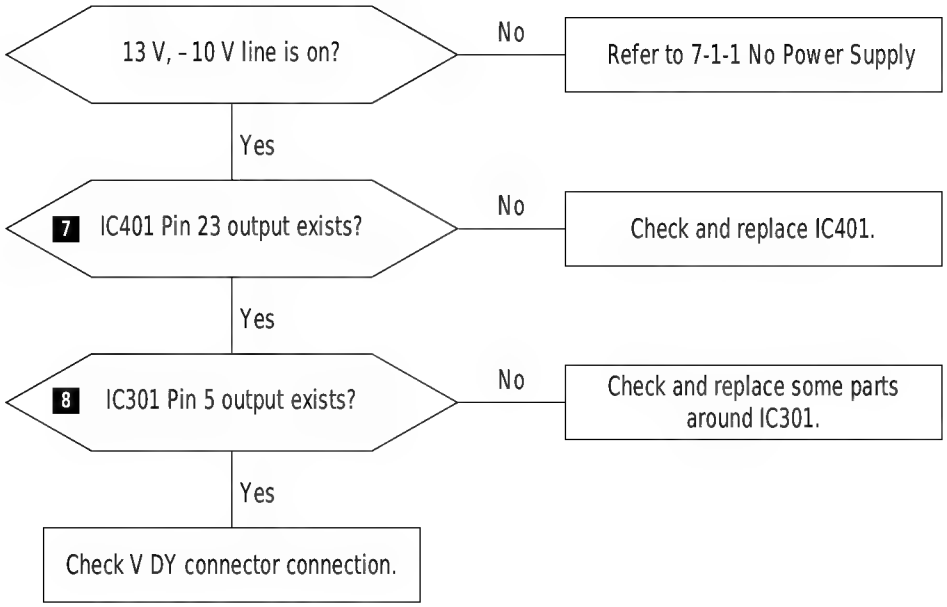
7-1-9 Para. or Pin Balance Failure



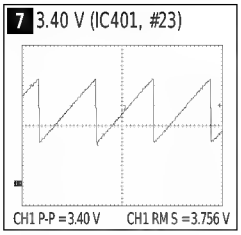
7-1-10 Tilt Failure

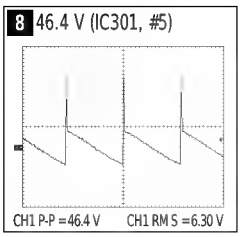


7-1-11 V Deflection Failure

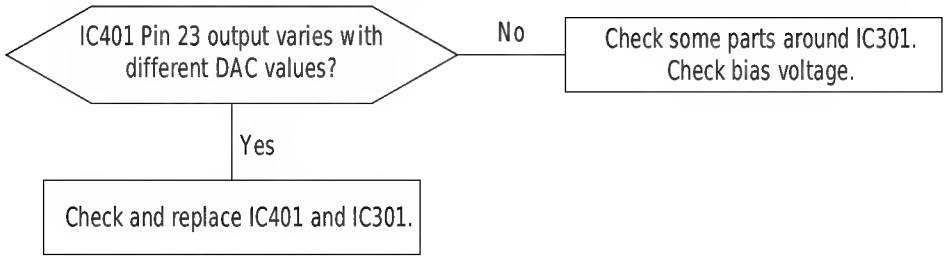


WAVEFORMS

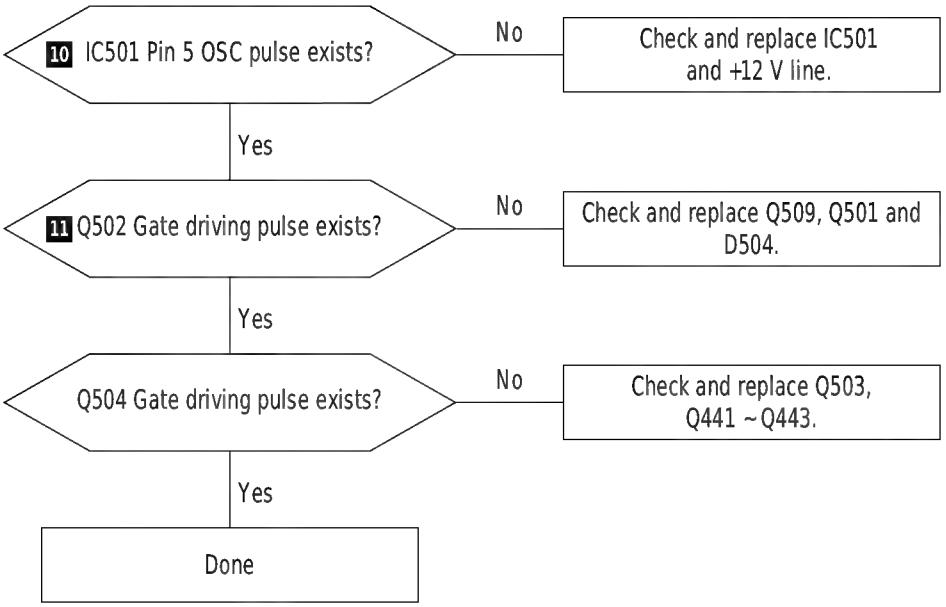




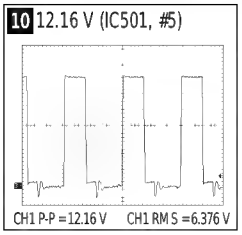
7-1-12 V Size or Pos. Variation Failure

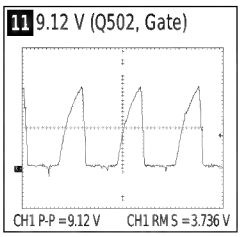

IC401 Pin 23 output varies with different DAC values?
No
Check some parts around IC301. Check bias voltage.
Yes
Check and replace IC401 and IC301.

7-1-13 High Voltage Failure

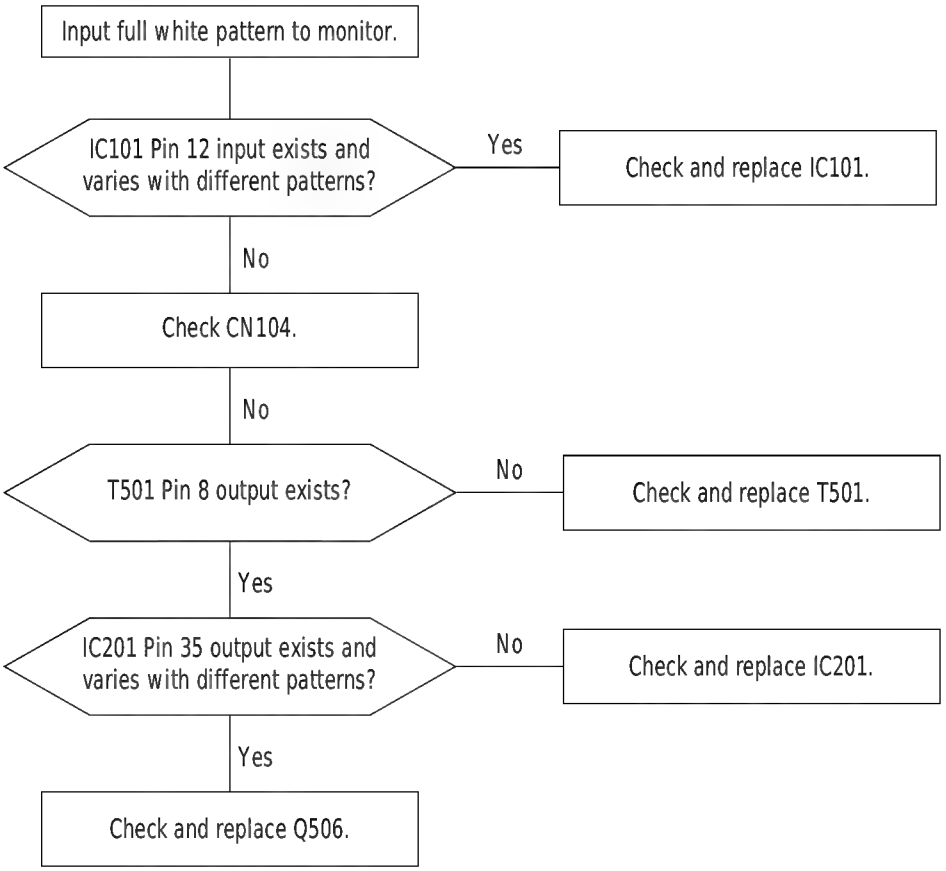


WAVEFORMS

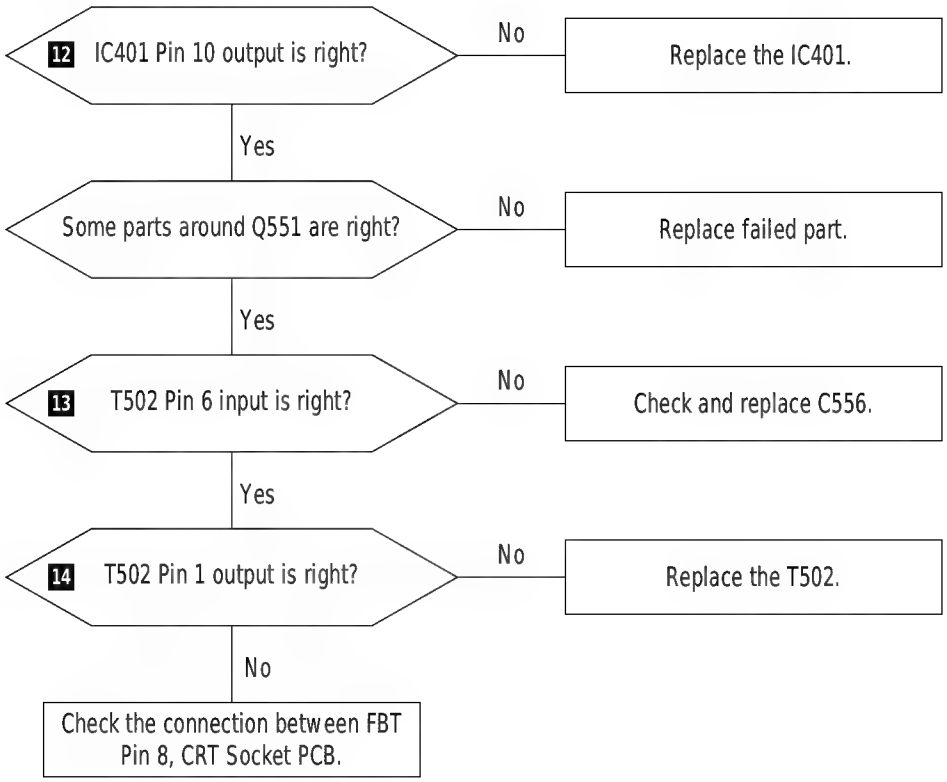




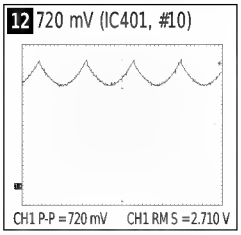
7-1-14 ABL Failure

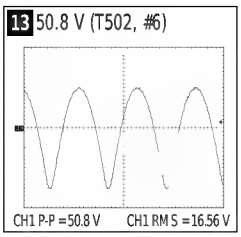


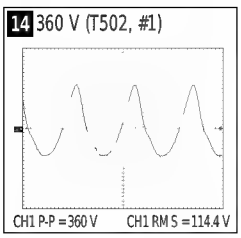
7-1-15 Dynamic Focus Failure



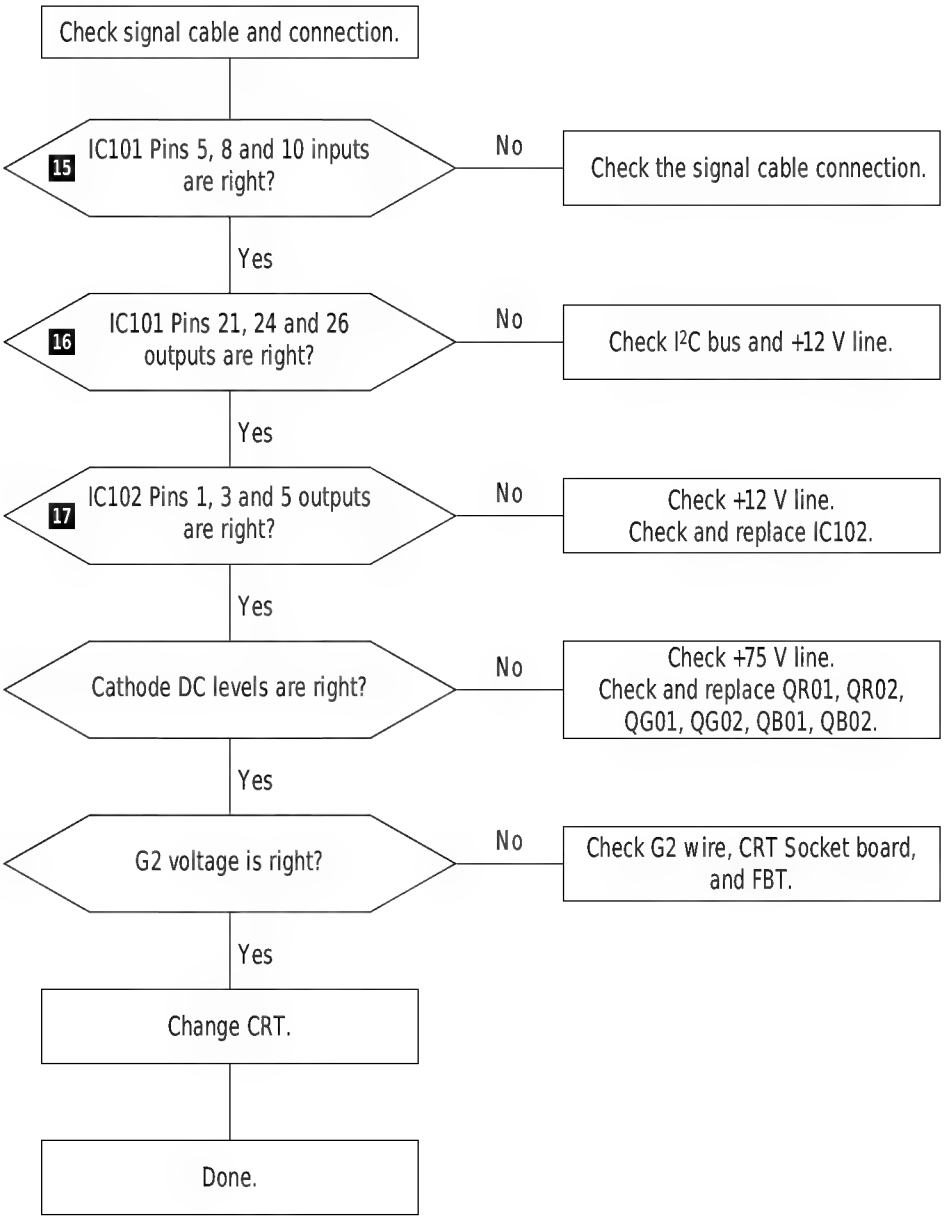
WAVEFORMS





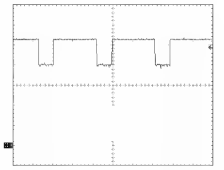


7-1-16 No Video

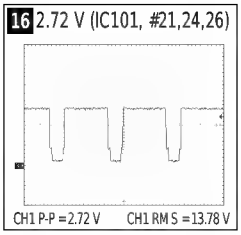


WAVEFORMS

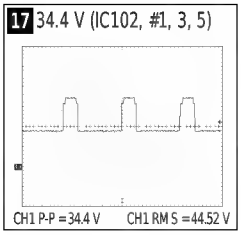
15 780 mV (IC101, #5, 8, 10)



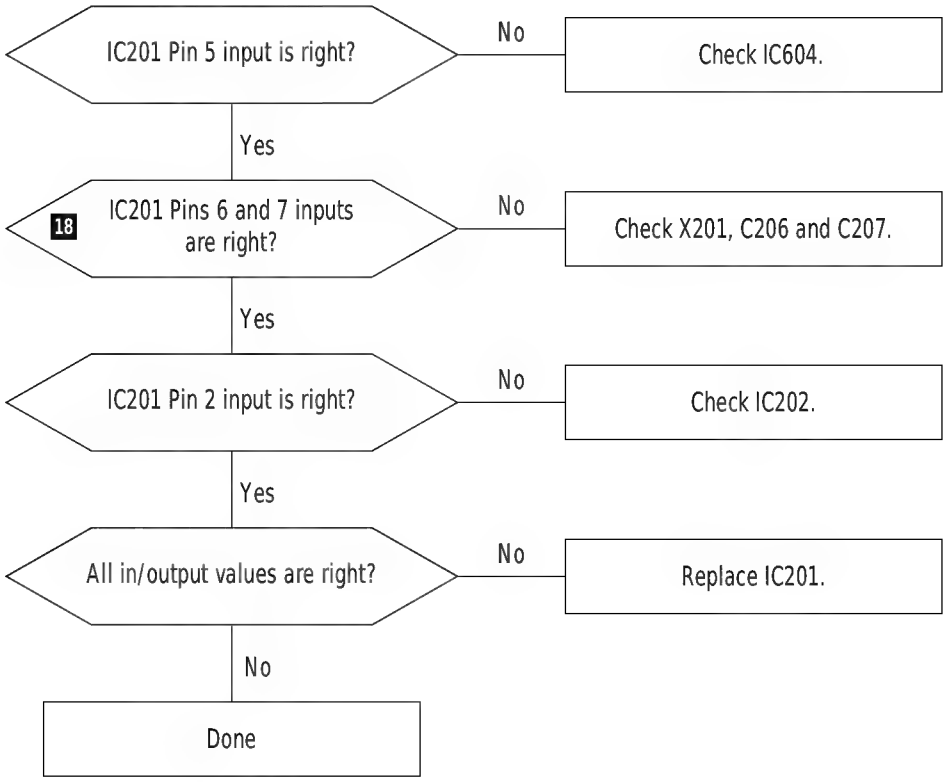
16 2.72 V (IC101, #21,24,26)



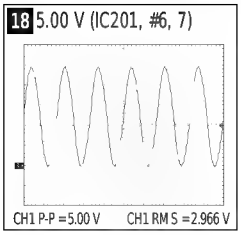
17 34.4 V (IC102, #1, 3, 5)



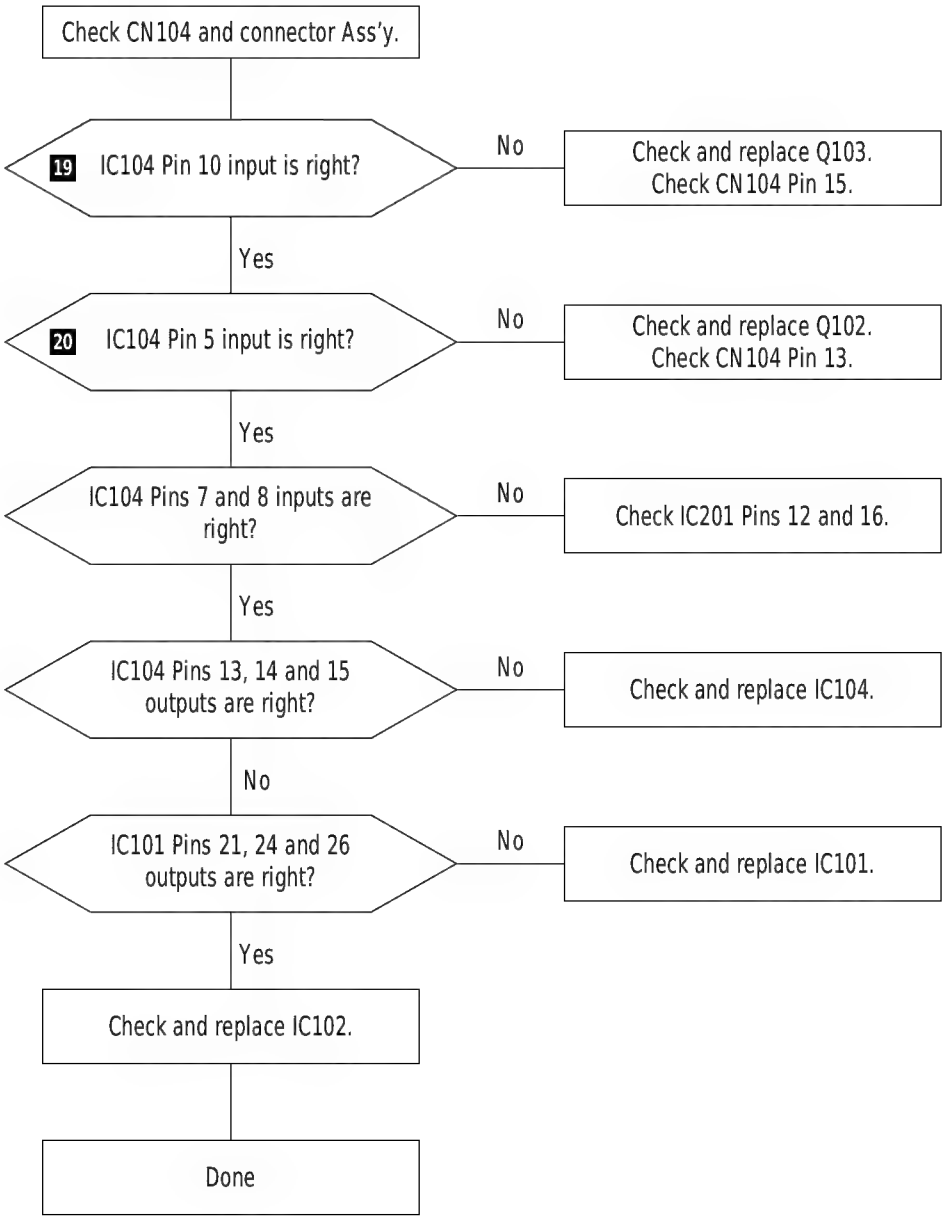
7-1-17 Micom Failure



WAVEFORMS

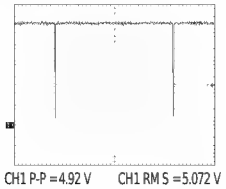


7-1-18 OSD Failure

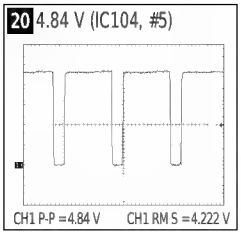


WAVEFORMS

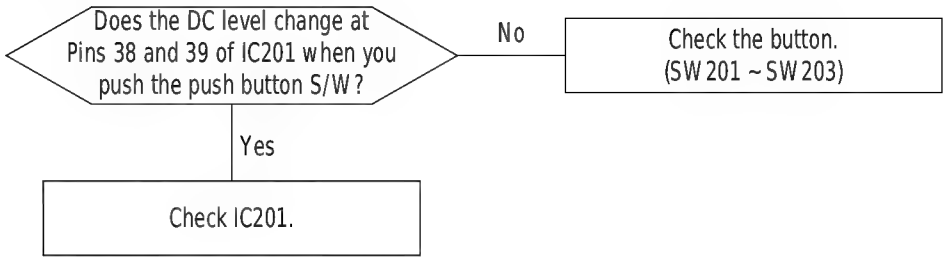
19 4.92 V (IC104, #10)



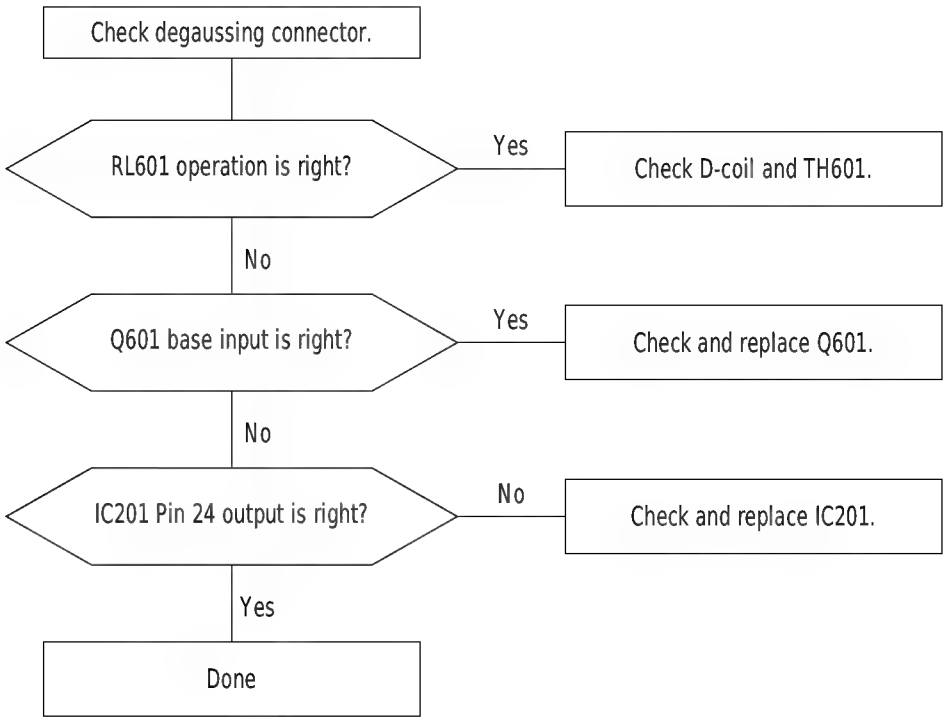
20 4.84 V (IC104, #5)



7-1-19 User Control Failure

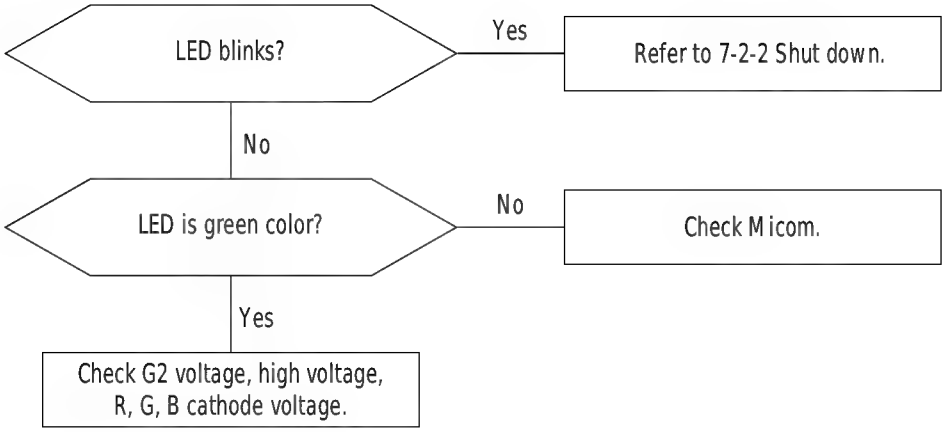

Does the DC level change at Pins 38 and 39 of IC201 when you push the push button S/W?
No
Check the button. (SW201 ~ SW203)
Yes
Check IC201.

7-1-20 Degaussing Failure

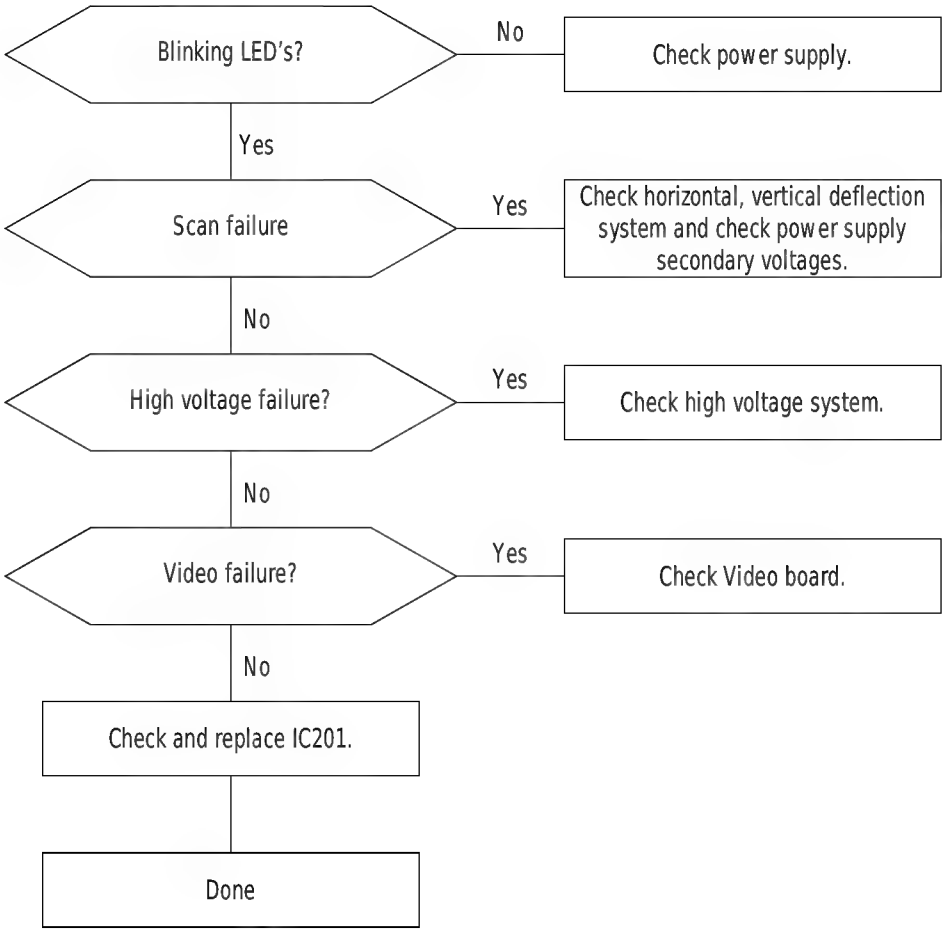


7-2 General Troubleshooting

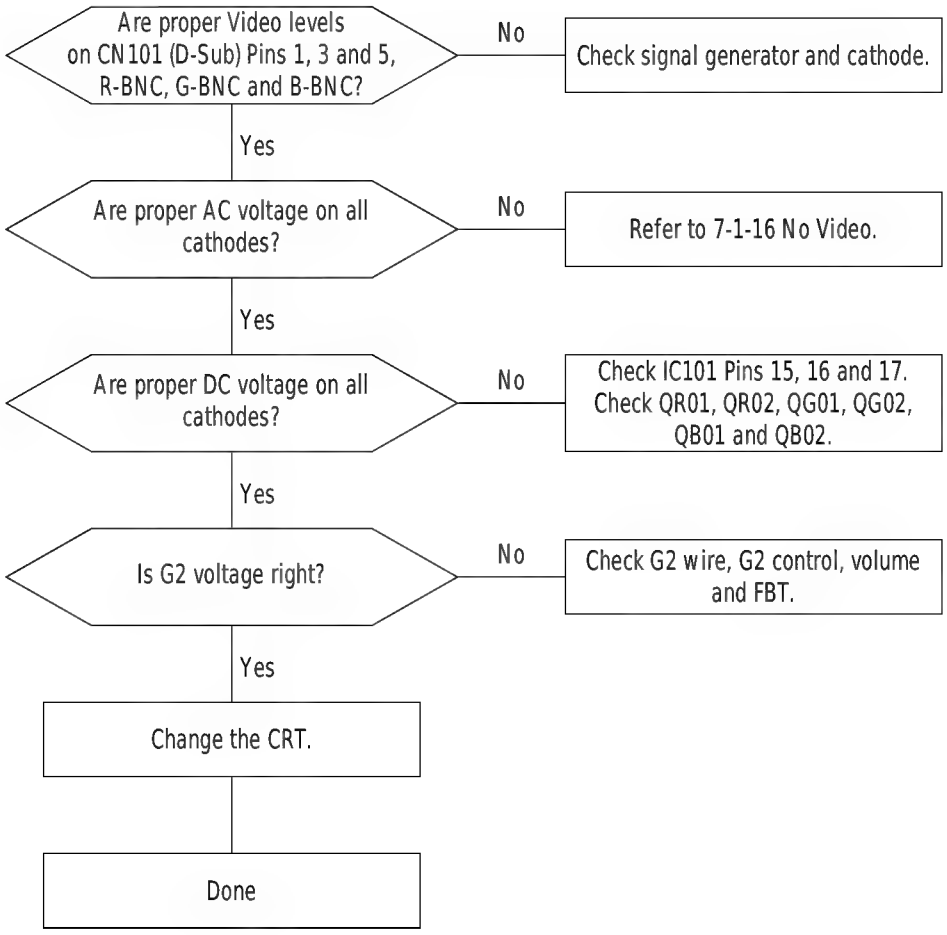
7-2-1 No Picture



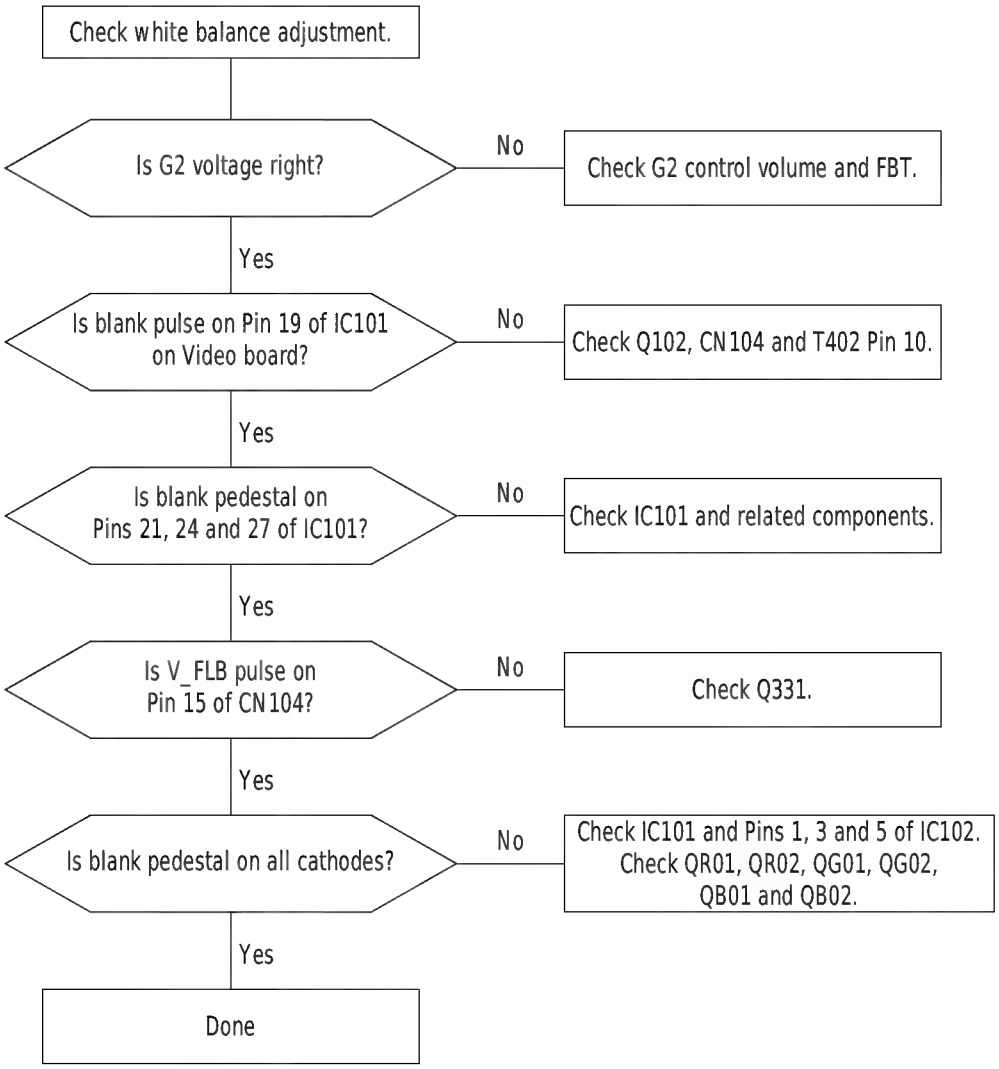
7-2-2 Shut Down



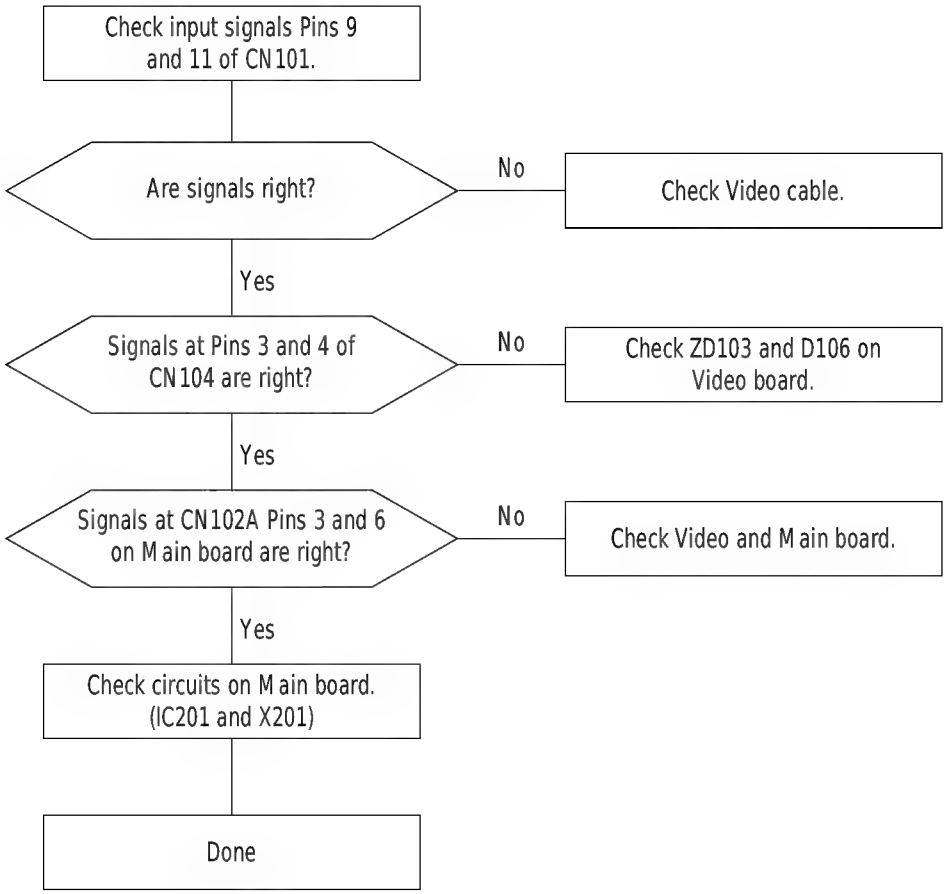
7-2-3 Missing Color


Are proper Video levels on CN101 (D-Sub) Pins 1, 3 and 5, R-BNC, G-BNC and B-BNC?
No
Check signal generator and cathode.
Yes
Are proper AC voltage on all cathodes?
No
Refer to 7-1-16 No Video.
Yes
Are proper DC voltage on all cathodes?
No
Check IC101 Pins 15, 16 and 17. Check QR01, QR02, QG01, QG02, QB01 and QB02.
Yes
Is G2 voltage right?
No
Check G2 wire, G2 control, volume and FBT.
Yes
Change the CRT.
Done

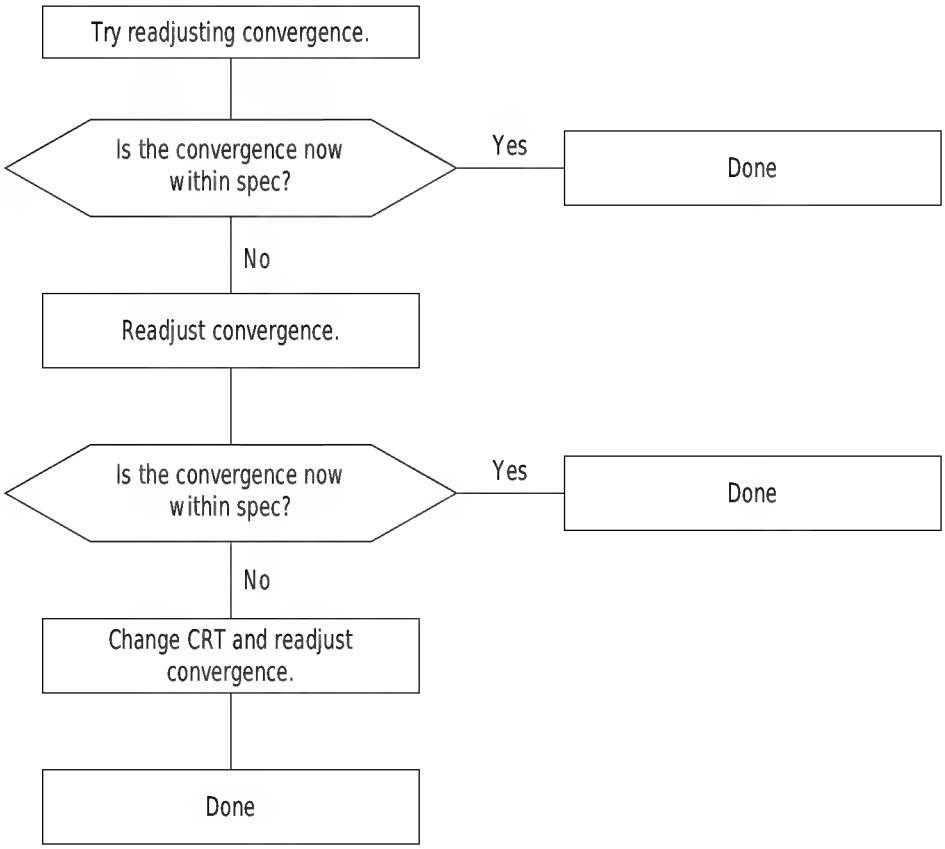
7-2-4 Visible Retrace


Check white balance adjustment.
Is G2 voltage right?
No
Check G2 control volume and FBT.
Yes
Is blank pulse on Pin 19 of IC101 on Video board?
No
Check Q102, CN104 and T402 Pin 10.
Yes
Is blank pedestal on Pins 21, 24 and 27 of IC101?
No
Check IC101 and related components.
Yes
Is V_FLB pulse on Pin 15 of CN104?
No
Check Q331.
Yes
Is blank pedestal on all cathodes?
No
Check IC101 and Pins 1, 3 and 5 of IC102. Check QR01, QR02, QG01, QG02, QB01 and QB02.
Yes
Done

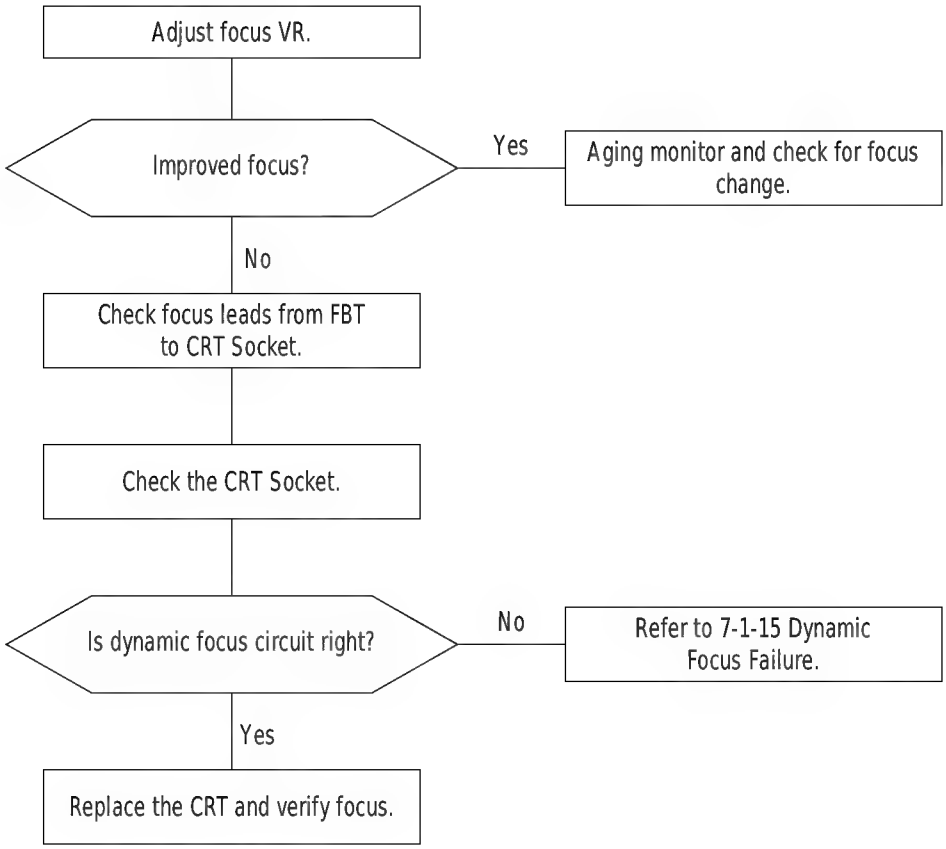
7-2-5 Unsynchronized Image


Check input signals Pins 9 and 11 of CN101.
Are signals right?
No
Check Video cable.
Yes
Signals at Pins 3 and 4 of CN104 are right?
No
Check ZD103 and D106 on Video board.
Yes
Signals at CN102A Pins 3 and 6 on Main board are right?
No
Check Video and Main board.
Yes
Check circuits on Main board. (IC201 and X201)
Done

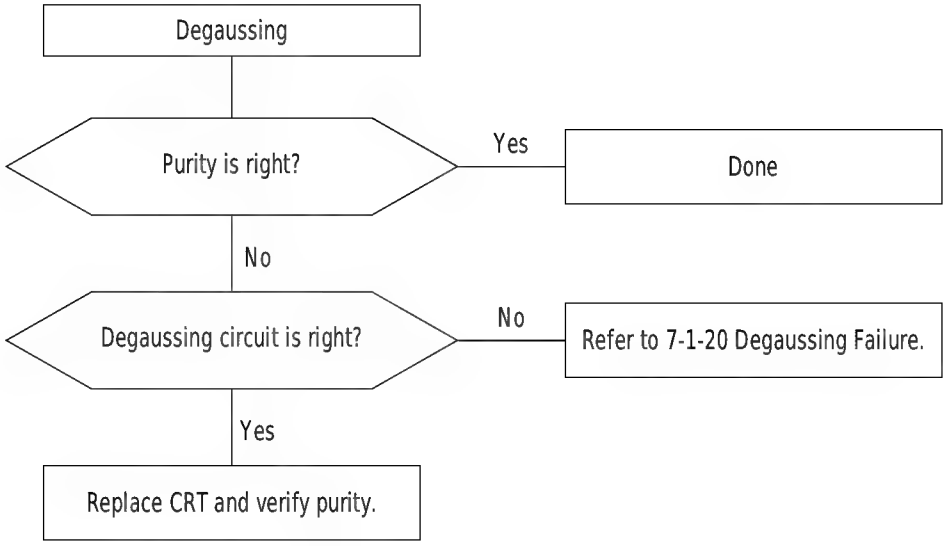
7-2-6 Misconvergence



7-2-7 Poor Focus



7-2-8 Purity Failure



9 Electrical Parts List

9-1 Main PCB Parts

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
BD311	23.7	140.0	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD312	40.4	122.7	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD401	50.9	105.5	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD402	74.7	139.8	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD441	192.0	229.9	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD501	27.6	193.2	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD601	195.3	45.6	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD621	180.2	107.7	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
BD622	215.4	106.6	3301-000011	MAG-CORE,FERRITE,BEAD	1.2UH,3.5_5.7MM,10 OHM	
C201	57.6	63.4	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C202	65.9	64.7	2401-000025	C-AL	100uF,20%,16V,GP,5mm,TP	
C203	35.6	77.7	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C204	40.6	80.3	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C206	48.2	71.4	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C207	44.0	71.4	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C209	23.0	63.9	2401-002299	C-AL	4.7uF,20%,50V,GP,5x7,5,TP	
C212	23.3	79.0	2401-002299	C-AL	4.7uF,20%,50V,GP,5x7,5,TP	
C213	74.4	35.5	2401-000027	C-AL	4.7uF,20%,50V,GP,5mm,TP	
C214	57.1	31.4	2401-000027	C-AL	4.7uF,20%,50V,GP,5mm,TP	
C216	63.2	31.4	2201-000234	C-CERAMIC,DISC	150pF,5%,50V,NPO,10x3.5,5,TP	
C217	55.3	94.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C218	55.2	99.6	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C219	60.5	92.2	2201-000144	C-CERAMIC,DISC	100pF,5%,50V,NPO,8.0X4.0,5,TP	
C221	63.6	60.4	2201-000138	C-CERAMIC,DISC	100pF,10%,50V,Y5P,4.0X4.0,2.5	
C302	112.3	71.9	2301-000287	C-FILM,PEF	5.6nF,5%,100V,2A,5P	
C303	96.3	82.9	2401-000037	C-AL	470uF,20%,16V,GP,5mm,TP	
C304	119.9	48.3	2401-000849	C-AL	220uF,20%,35V,GP,5mm,TP	
C306	119.8	96.4	2401-000023	C-AL	1uF,20%,50V,GP,5mm,TP	
C307	88.8	27.3	2201-000163	C-CERAMIC,DISC	10nF,+80-20%,50V,Y5V,6.5x5mm,2	
C308	97.3	19.8	2201-000163	C-CERAMIC,DISC	10nF,+80-20%,50V,Y5V,6.5x5mm,2	
C309	113.7	59.5	2305-000004	C-FILM,MPEF	220nF,10%,100V,12.7x16,5mm,TP	
C311	42.7	137.3	2301-000168	C-FILM,PEF	150nF,5%,100V,11.5x19mm,7.5mm	
C312	32.5	138.7	2305-000001	C-FILM,MPEF	470nF,10%,63V,6.0X15.5X7.5,5mm	
C313	25.2	135.8	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C314	31.5	128.1	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C316	121.7	159.8	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C317	118.7	65.8	2301-000020	C-FILM,PEF	27nF,5%,100V,7.3x4x12.5mm,5mm	
C321	91.6	28.5	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C331	212.6	224.7	2301-000014	C-FILM,PEF	6.8nF,5%,100V,5.8x12.5mm,5mm,T	
C332	264.2	238.3	2301-001027	C-FILM,PEF	15nF,10%,250V,9.5x12x4.5,5mm,T	
C401	67.2	159.8	2301-000231	C-FILM,PEF	3.3nF,5%,100V,5.8x12.5mm,5mm,T	
C402	58.1	159.6	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C403	49.1	159.6	2202-000003	C-CERAMIC,MLC-RADIAL	680pF,0.02,100V,NPO,5.1x5.1x3.	
C404	54.2	168.7	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C405	158.3	234.7	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C406	52.9	173.8	2401-000027	C-AL	4.7uF,20%,50V,GP,5mm,TP	
C407	43.9	163.6	2305-000280	C-FILM,M PEF	220nF,10%,63V,7.5x13.5mm,5mm,T	
C408	42.8	169.6	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C409	38.7	160.0	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C410	32.2	149.7	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C411	43.2	175.7	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C412	22.6	180.6	2301-000231	C-FILM,PEF	3.3nF,5%,100V,5.8x12.5mm,5mm,T	17"
			2301-000014	C-FILM,PEF	6.8nF,5%,100V,5.8x12.5mm,5mm,T	16"
C413	36.0	163.8	2305-000001	C-FILM,M PEF	470nF,10%,63V,6.0X15.5X7.5,5mm	
C414	35.6	157.6	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	17"/16"
C415	78.2	128.0	2201-000651	C-CERAMIC,DISC	68pF,5%,50V,NPO,8x3,5,TP	
C417	17.1	160.4	2401-000649	C-AL	2.2uF,20%,50V,BP,6x11mm,5mm,TP	17"/16"
			2401-001016	C-AL	3.3uF,20%,50V,BP,5x11mm,5mm,TP	15"
C418	27.7	155.4	2301-000011	C-FILM,PEF	1nF,5%,100V,10.5x12.5x6.5,5mm	
C419	58.4	122.4	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C421	65.8	122.4	2201-000009	C-CERAMIC,DISC	22pF,5%,50V,NPO,4x3.5,5,TP	
C422	68.0	136.5	2401-000037	C-AL	470uF,20%,16V,GP,5mm,TP	
C423	58.2	139.9	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C424	68.5	143.2	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C426	65.7	141.0	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C431	128.5	180.9	2401-000887	C-AL	220uF,20%,63V,GP,10x20mm,5mm,T	
C432	118.6	208.8	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C433	136.7	218.8	2301-001194	C-FILM,M PPF	470nF,5%,250V,TP,18x16x8,7.5	
C434	43.5	185.5	2301-000017	C-FILM,PEF	33nF,10%,100V,7.5x12.5mm,5mm,T	
C441	84.8	149.6	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C442	116.0	172.0	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C443	127.6	164.5	2401-000028	C-AL	10uF,20%,50V,GP,5x11mm,5mm,TP	
C444	128.4	174.4	2201-000291	C-CERAMIC,DISC	1nF,10%,500V,Y5P,8.5x5M M,5,TP	
C446	164.6	182.7	2305-000231	C-FILM,M PEF	1uF,10%,63V,5P	
C447	177.9	218.0	2301-001206	C-FILM,PPF	4.4nF,5%,2.5KV,BK,29x21x13,20	⚠
C461	81.2	217.1	2306-000249	C-FILM,M PPF	680nF,5%,250V,26.5x16.5mm,5mm	
			2306-000147	C-FILM,M PPF	1uF,5%,250V,26.5x16.5mm,5mm	16"
C462	69.6	227.9	2306-000164	C-FILM,M PPF	220nF,5%,250V,19x22x10,7.5mm,T	SDD, Toshiba
			2306-000171	C-FILM,M PPF	270nF,5%,250V,19x22x10,7.5mm	16"
C463	41.3	227.2	2306-000131	C-FILM,M PPF	150nF,5%,250V,21.5x11mm,7.5mm	SDD, Toshiba
			2306-000137	C-FILM,M PPF	184nF,5%,250V,21.5x11mm,7.5mm	16"
C464	59.2	234.7	2306-000131	C-FILM,M PPF	150nF,5%,250V,21.5x11mm,7.5mm	SDD, Toshiba
C465	51.0	234.6	2306-000131	C-FILM,M PPF	150nF,5%,250V,21.5x11mm,7.5mm	SDD, Toshiba
			2306-000137	C-FILM,M PPF	184nF,5%,250V,21.5x11mm,7.5mm	16"
C466	124.2	232.1	2305-001033	C-FILM,M PEF	15nF,10%,250V,13X9.0X4.5mm,5mm	
C472	89.3	224.8	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C501	161.6	196.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C502	142.9	134.0	2301-000015	C-FILM,PEF	10nF,5%,100V,7x3.2x7mm,5mm,TP	
C503	157.7	124.0	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C504	169.1	124.0	2401-001016	C-AL	3.3uF,20%,50V,BP,6x11mm,5mm,TP	
C505	205.4	171.0	2401-000649	C-AL	2.2uF,20%,50V,BP,6x11mm,5mm,TP	15"/17"
C506	134.4	134.1	2305-000280	C-FILM,M PEF	220nF,10%,63V,7.5x13.5mm,5mm,T	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C507	155.7	134.5	2401-000053	C-AL	10uF,20%,25V,GP,5mm,TP	
C508	159.8	137.0	2401-001556	C-AL	47uF,20%,35V,GP,8x11.5mm,5mm,T	
C509	160.6	134.5	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C510	59.8	24.8	2401-000027	C-AL	4.7uF,20%,50V,GP,5mm,TP	
C511	123.4	145.2	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C512	218.3	134.1	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C513	181.7	150.7	2401-000887	C-AL	220uF,20%,63V,GP,10x20mm,5mm,T	
C514	237.0	137.4	2306-000147	C-FILM,MPPF	1uF,5%,250V,TP,18x16x8,7.5	⚠
C516	243.6	118.9	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C518	264.9	133.5	2301-001215	C-FILM,PPF	1.8nF,5%,1.6KV,TP,21.5x12.5x7.	17" ⚠
			2303-000195	C-FILM,PPF	2.0nF,5%,1.6KV,TP,21x13mm,17.5mm	15" ⚠
			2309-000106	C-FILM,PPF	2.2nF,5%,1.6KV,TP,21.5x12.5mm	16"
C519	284.2	186.3	2401-000638	C-AL	2.2uF,20%,350V,WT,10x12.5mm,5m	17"/16"
C521	289.6	162.3	2401-001195	C-AL	33uF,20%,50V,GP,5mm,TP	
C522	288.0	176.9	2401-000026	C-AL	3.3uF,20%,50V,GP,5mm,TP	
C523	285.9	230.8	2401-000638	C-AL	2.2uF,20%,350V,WT,10x12.5mm,5m	
C524	127.8	134.0	2201-000011	C-CERAMIC,DISC	47pF,5%,50V,NPO,6.5x3.0,5,TP	
C541	95.5	154.9	2401-000031	C-AL	47uF,20%,16V,GP,5mm,TP	
C542	102.6	129.3	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C551	207.7	156.1	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	17"/16"
C552	205.6	163.1	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	17"/16"
C553	68.9	181.5	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	17"/16"
C554	280.5	214.2	2201-000552	C-CERAMIC,DISC	470pF,10%,1KV,Y5P,8x5MM,5,BK	17"/16"
C556	200.2	222.6	2305-000310	C-FILM,MPEF	22nF,5%,250V,14.5x8.8mm,7.5mm	17"/16"
C557	20.8	85.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C558	286.2	130.9	2401-000025	C-AL	100uF,20%,16V,GP,5mm,TP	
C603	299.1	33.1	2301-001195	C-FILM,MPPF	150nF,10%,275VAC,BK,26x16.5x7	
C604	237.9	23.5	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	
C605	243.2	78.7	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	
C606	264.1	29.5	2301-001195	C-FILM,MPPF	150nF,10%,275VAC,BK,26x16.5x7	
C607	264.3	23.5	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	
C608	254.8	86.1	2201-000024	C-CERAMIC,DISC	4.7nF,20%,250VAC,Y5U,16x7,7.5	
C609	227.1	94.8	2401-000050	C-AL	10uF,20%,16V,GP,5x11mm,2mm,TP	
C610	240.6	39.2	2401-002128	C-AL	220uF,20%,400V,GP,BK,25x40,10m	17"/16"
			2401-003367	C-AL	180uF,20%,400V,GP,BK,25x35mm	15"
C611	179.6	22.8	2301-000016	C-FILM,PEF	22nF,5%,100V,7.2x4.5x9.0mm,5mm	
C612	223.9	37.2	2201-000019	C-CERAMIC,DISC	10nF,+80-20%,500V,Y5V,10x4,5,T	
C613	216.8	79.3	2305-000280	C-FILM,MPEF	220nF,10%,63V,7.5x13.5mm,5mm,T	
C614	209.7	17.1	2401-001195	C-AL	33uF,20%,50V,GP,5mm,TP	
C615	209.3	83.5	2301-000010	C-FILM,PEF	100nF,5%,100V,11.5x12.5mm,5mm	
C616	191.3	31.1	2305-000280	C-FILM,MPEF	220nF,10%,63V,7.5x13.5mm,5mm,T	
C617	209.1	49.7	2202-000394	C-CERAMIC,MLC-RADIAL	1nF,5%,100V,NPO,5.1x3.2,5.1,TP	
C618	195.4	50.0	2201-000012	C-CERAMIC,DISC	220pF,10%,1KV,Y5P,6.3x5,5,TP	
C619	305.8	40.4	2201-000023	C-CERAMIC,DISC	2.2nF,20%,125V,Y5U,11x7,5,TP	
C620	141.2	92.6	2201-000021	C-CERAMIC,DISC	100nF,+80-20%,50V,Y5V,8x3,5,TP	
C621	140.0	83.0	2401-000142	C-AL	1000uF,20%,16V,WT,10x20mm,5mm	
C622	101.2	101.5	2401-000025	C-AL	100uF,20%,16V,GP,5mm,TP	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C623_M	167.9	98.8	2401-000151	C-AL	1000uF,20%,25V,GP,12.5x20mm,5m	M/MEDIA
C624	142.3	67.1	2401-000142	C-AL	1000uF,20%,16V,WT,10x20mm,5mm	
C625	133.9	39.5	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	
C626	148.3	14.6	2301-000012	C-FILM,PEF	2.2nF,5%,100V,10.5x12.5x6.5,5m	
C627	130.5	23.2	2301-000287	C-FILM,PEF	5.6nF,5%,100V,2A,5P	
C628	129.6	55.4	2401-000540	C-AL	150uF,20%,63V,LZ,10x25mm,5mm,T	
C629	136.6	33.4	2401-001576	C-AL	47uF,20%,50V,GP,8x11.5mm,5mm,T	
C630	118.9	33.9	2401-000037	C-AL	470uF,20%,16V,GP,5mm,TP	
C631	131.8	89.1	2401-000292	C-AL	100uF,20%,16V,WT,8x11.5mm,5mm	
C633_M	155.2	79.3	2201-000469	C-CERAMIC,DISC	330pF,10%,500V,Y5P,6x3.5,5,TP	M/MEDIA
CF300			BH39-40366G	CBF-HARNESS	3P,200MM,BRN/YEL,UL1015,AWG22	15"
CN_M	3722-001159		JACK-DC POWER	3P/2C,2.47mm,NI,BLK,NO	M/MEDIA	
CN_TILT	93.8	16.8	3711-000197	CONNECTOR-HEADER	1WALL,3P,1R,2.5mm,STRAIGHT,SN	
CN102A	315.3	171.6	3711-003568	CONNECTOR-HEADER	NOWALL,22P,1R,2.54mm,STRAIGHT	
CN102C	323.0	155.0	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN102E	315.3	230.5	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN301	123.5	62.2	3711-001483	CONNECTOR-HEADER	NOWALL,3P,1R,5.0mm,STRAIGHT,SN	
CN302			3711-000217	CONNECTOR-HEADER	1WALL,3P,1R,3.96MM,STRAIGHT,SN	
CN441	178.5	185.7	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN442	178.5	195.7	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN443	178.5	203.7	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	⚠
CN446			BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	15"
CN601	314.2	28.9	3721-001006	PLUG-AC POWER	3P,10/24mm,SN	
CN602	275.1	82.3	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	17"/16"
CN603	265.1	82.3	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	17"/16"
CN604	232.2	66.8	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN605	232.2	59.4	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN	
CN606			3711-000217	CONNECTOR-HEADER	1WALL,3P,1R,3.96MM,STRAIGHT,SN	15"
D201	83.1	104.5	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D301	106.1	55.1	0402-000128	DIODE-RECTIFIER	1N4002,DO-41	
D331	299.5	218.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D401	40.4	175.6	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D402	170.5	233.7	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D403	13.2	184.2	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	17"/16"
D404	35.5	188.3	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	17"/16"
D405	59.1	163.0	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D431	122.5	207.3	0402-000274	DIODE-RECTIFIER	UF4004,DO-41	
D432	58.2	184.7	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D441	181.2	176.1	0402-000274	DIODE-RECTIFIER	UF4004,DO-41	
D442	191.3	217.1	0402-001201	DIODE-RECTIFIER	SDS06U150S,1500V,6A,TO220F,ST	
D451	144.4	234.7	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D452	133.4	231.2	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D501	160.8	159.3	0403-000005	DIODE-ZENER	UZ5.1B,5.1V,4.8-5.4V,500mW,DO-	
D502	165.2	134.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D503	181.2	133.9	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D504	138.5	148.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D506	229.2	132.3	0402-000274	DIODE-RECTIFIER	UF4004,DO-41	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
D507	181.2	131.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D508	266.8	166.5	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	17"/16"
D509	269.5	160.0	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D511	272.9	216.4	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D513	270.2	239.0	0401-000006	DIODE-SWITCHING	BAV21,200V,250mA,400mW,50nS,DO	
D514	279.4	238.6	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D516	282.8	217.1	0403-000005	DIODE-ZENER	UZ5.1B,5.1V,4.8-5.4V,500mW,DO-	
D541	98.9	134.7	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D542	96.1	134.7	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D543	86.1	121.0	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D601	246.3	90.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D602	252.3	62.8	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D603	237.3	58.6	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D604	237.3	73.1	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D605	252.3	68.2	0402-001111	DIODE-RECTIFIER	1N5397GP,600V,1.5A,DO-204AC,TP	
D606	195.2	41.2	0402-000012	DIODE-RECTIFIER	UF4007,DO-41	
D607	190.4	56.5	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
D609	200.8	79.3	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D610	184.3	25.8	0403-000351	DIODE-ZENER	UZ4.7B,4.7V,4.4-5.0V,500mW,DO-	
D611	195.4	62.3	0402-000017	DIODE-RECTIFIER	RGP02-12,1200V,0.5A,DO-204AL	
D612	187.7	76.9	0403-001131	DIODE-ZENER	UZ3.3BSA,3.6V,3.47-3.68V,500mW	
D621	150.7	72.2	0402-001069	DIODE-RECTIFIER	RL10Z,200V,2A,DO,TP	
D622_M	158.1	75.4	0402-000005	DIODE-RECTIFIER	31DF4,400V,3A,DO-201AD	M/MEDIA
D623	152.9	59.2	0402-001190	DIODE-RECTIFIER	RG10Z,200V,1.2A,DO-15,TP	
			0402-000274	DIODE-RECTIFIER	UF4004,DO-41	16"
D624	151.7	44.8	0402-000005	DIODE-RECTIFIER	31DF4,400V,3A,DO-201AD	
D625	151.7	38.6	0402-000012	DIODE-RECTIFIER	UF4007,DO-41	
D626	138.2	26.4	0402-001114	DIODE-RECTIFIER	1N4936GP,400V,1A,DO-204AL,TP	
F601_M	309.1	65.8	3601-000103	FUSE-FERRULE	125V,1.5A,QUICK ACT,CERAMIC,2.	M/MEDIA
FH1	303.3	17.0	3602-000001	FUSE-CLIP	800GF,4005.2X20,30MOHM	⚠
FUSE	303.3	17.0	3601-000004	FUSE-FERRULE	250V,3.15A,SLOW BLOW,CERAMIC,5	
HS301	124.3	87.3	BH62-30415A	HEAT/SINK	A1050S,T2.0,CKB5237	
HS401	77.7	202.6	BH62-30024A	HEAT/SINK-TR	SPC,T1,SN,CFX1577L	
HS402	106.6	214.3	BH62-30015A	HEAT/SINK-TR	SCP-1,T1,SN,CVM4967,3111	
HS501	193.7	236.0	BH62-30416A	HEAT/SINK-FBT	A1050S,T1.0,CKB7227	
HS601	215.9	49.9	BH62-30411A	HEAT/SINK	A6063S,T2.0,CGH7609	
IC201	60.7	59.5	BH09-10304X	IC-MICOM,Masking	HB-Chassis,LSC500883B,CHB_02	
IC202	41.6	84.3	1103-001020	IC-EEPROM	24LC04,4Kx8BIT,DIP,8P,300MIL	
IC203	47.0	91.3	1103-001087	IC-EEPROM	24LC21A,128x8BIT,DIP,8P,300MIL	
IC301	96.5	53.8	1204-000013	IC-CONSUMER/CIRCUIT	9302,TO-220,7P,15V/30V,VERTIC	
IC302	103.6	155.2	1201-000229	IC-OP AMP	324,DIP,14P,300MIL,QUAD,100V/m	
IC401	61.6	154.3	1204-001414	IC-DEF. PROCESSOR	TDA9109/S,DIP,32P,300MIL,PLAST	
IC501	133.0	138.1	1203-000182	IC-POSI.ADJUST REG.	494,DIP,16P,300MIL,PLASTIC	
IC601	224.3	43.9	BH13-10335J	IC-HYBRID	CKA5227,KA2S0680,SIP,5P,FET+CO	
IC602	109.9	102.0	1203-001471	IC-POSI.FIXED REG.	12RD11,TO-220,4P,PLASTIC,11.	
IC603	151.9	20.5	1203-000002	IC-LIN,REGULATOR	431,TO-92,3,36V(T)-SIMPLE	
IC604	129.3	102.2	1203-000001	IC-POSI.ADJUST REG.	7805,TO-220,3P,PLASTIC,4.8/5	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
JP1	244.6	237.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP2	244.6	240.1	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP3	88.9	190.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP4	90.2	186.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP5	244.6	230.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP6	258.5	224.7	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP7	296.8	228.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP8	172.0	216.8	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP9	172.0	216.8	BH39-40305U	JUMPER	JUMPER WIRE	15"
JP10	207.2	214.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP11	210.1	215.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP13	311.6	218.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP14	145.5	207.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP15	299.3	204.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP16	299.3	207.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP17	303.8	212.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP18	309.1	210.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP19	272.3	156.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP20	272.7	194.0	BH39-40305U	JUMPER	JUMPER WIRE	
JP21	308.7	200.1	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP22	301.4	26.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP23	84.7	176.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP25	103.7	190.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP26	106.5	187.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP27	120.3	187.0	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP28	275.5	187.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP29	278.0	188.1	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP30	310.0	191.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP31	184.5	179.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP33	78.0	162.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP34	148.6	168.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP35	173.5	167.5	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP36	176.1	167.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP37	178.6	167.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP38	68.9	146.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP39	277.8	163.1	BH39-40305U	JUMPER	JUMPER WIRE	17"/16"
JP40	113.5	159.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP42	167.5	161.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP43	170.7	155.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP44	51.4	140.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP45	98.9	145.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP46	153.7	145.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP47	43.6	133.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP48	46.1	133.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP49	56.2	141.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP50	148.2	134.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP51	170.9	140.8	BH39-40305U	JUMPER	JUMPER WIRE	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
JP52	73.8	132.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP53	79.4	154.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP54	88.5	130.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP55	90.6	122.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP56	106.5	122.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP58	124.5	131.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP59	123.4	124.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP60	25.0	116.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP61	28.1	116.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP63	65.3	115.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP64	85.2	114.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP65	85.2	117.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP66	90.2	116.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP67	93.0	116.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP68	95.8	116.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP69	101.3	121.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP70	35.3	63.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP71	265.7	119.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP72	284.1	119.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP73	292.7	116.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP74	79.7	102.0	BH39-40305U	JUMPER	JUMPER WIRE	
JP75	82.1	108.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP76	115.6	107.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP77	123.4	103.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP78	132.6	108.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP79	137.4	108.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP80	135.2	125.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP81	141.2	107.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP82	176.3	107.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP83	176.3	105.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP84	109.0	37.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP85	29.0	100.0	BH39-40305U	JUMPER	JUMPER WIRE	
JP86	153.2	235.0	BH39-40305U	JUMPER	JUMPER WIRE	
JP87	65.1	93.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP88	105.0	93.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP89	249.5	97.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP90	84.5	88.3	BH39-40305U	JUMPER	JUMPER WIRE	
JP91	84.0	90.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP92	170.0	84.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP93	45.0	80.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP94	65.2	75.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP95	65.6	72.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP96	101.8	221.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP97	146.8	73.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP98	51.4	65.4	BH39-40305U	JUMPER	JUMPER WIRE	
JP99	54.1	65.5	BH39-40305U	JUMPER	JUMPER WIRE	15"
JP100	39.1	118.9	BH39-40305U	JUMPER	JUMPER WIRE	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
JP101	43.2	118.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP102	82.2	69.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP103	103.4	62.0	BH39-40305U	JUMPER	JUMPER WIRE	
JP105	223.7	64.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP106	74.2	54.7	BH39-40305U	JUMPER	JUMPER WIRE	
JP107	70.2	45.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP108	83.5	41.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP109	147.6	42.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP111	97.2	31.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP112	195.2	37.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP113	85.7	38.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP114	194.3	18.2	BH39-40305U	JUMPER	JUMPER WIRE	
JP115	198.9	16.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP116	284.9	28.8	BH39-40305U	JUMPER	JUMPER WIRE	
JP117	28.8	94.5	BH39-40305U	JUMPER	JUMPER WIRE	
JP118	110.9	186.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP119	303.8	214.6	BH39-40305U	JUMPER	JUMPER WIRE	
JP120	70.2	148.9	BH39-40305U	JUMPER	JUMPER WIRE	
JP121	270.2	179.1	BH39-40305U	JUMPER	JUMPER WIRE	
JP122	292.8	183.9	BH39-40305U	JUMPER	JUMPER WIRE	
L401	61.6	174.7	2701-000154	INDUCTOR-AXIAL	220uH,10%,4.2x9.8mm	
L405	89.7	135.5	2701-000154	INDUCTOR-AXIAL	220uH,10%,4.2x9.8mm	
L431	127.6	190.8	BH27-20345A	COIL-CHOKE	150uH,10%,DR1415,BULK	
L452	125.3	224.1	BH27-20343H	COIL-PEAKING	2.7MH,10%,DR8*8,TP	
L501	186.2	130.9	BH27-20345B	COIL-CHOKE	100uH,10,DR1420(L-81,C:8.0),BU	
L503	151.1	120.4	2701-000179	INDUCTOR-AXIAL	33uH,10%,4.2x9.8mm	
L601	285.1	45.8	BH27-20310T	COIL-LINE FILTER	1-4:1OHM,31*22*36,B,1UEW0.	
OP201	15.0	31.8	0601-001147	LED	ROUND,GRN,4.75mm,565nm	
OP601	166.2	23.4	0604-001018	PHOTO-COUPLE	DAR-TR, 63-125%, 200mW, DIP-4, RST	
Q201	17.3	41.5	0501-000586	TR-SMALL SIGNAL	KSC945,NPN,TO-92,EBC	
Q321	90.5	34.8	0501-000404	TR-SMALL SIGNAL	KSD1616-Y,NPN,750mW,TO-92,TP,1	
Q322	90.5	40.2	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q331	226.2	224.8	0501-000586	TR-SMALL SIGNAL	KSC945,NPN,TO-92,EBC	
Q401	34.6	170.4	0501-000303	TR-SMALL SIGNAL	KSA733,PNP,TO-92,EBC	
Q402	29.2	170.4	0501-000586	TR-SMALL SIGNAL	KSC945,NPN,TO-92,EBC	17"/16"
Q431	80.8	173.6	0501-000122	TR-SMALL SIGNAL	2N3904,NPN,TO-92,EBC	
Q432	74.4	176.5	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,TO-92,EBC	
Q433	102.3	216.8	0505-000011	FET-SILICON	IRF630,N,200V,9A,0.4ohm,75W,TO	
Q441	95.5	164.8	0501-000122	TR-SMALL SIGNAL	2N3904,NPN,TO-92,EBC	
Q442	89.7	164.8	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,TO-92,EBC	
Q443	124.8	165.9	0501-000413	TR-SMALL SIGNAL	KSP44,NPN,625mW,TO-92,50-200	
Q447	189.9	175.7	0502-001001	TR-POWER	KSC5088,NPN,1500V,1500V,8A,50W	
Q461	74.7	205.1	0505-001129	FET-SILICON	IRF630A,N,200V,10uA,400mohm,72	
Q462	54.7	217.3	0505-001102	FET-SILICON	IRFR/U230A,N,200V,7.5A,400mohm	
Q463	39.2	217.3	0505-001102	FET-SILICON	IRFR/U230A,N,200V,7.5A,400mohm	
Q471	97.3	202.0	0501-000404	TR-SMALL SIGNAL	KSD1616-Y,NPN,750mW,TO-92,TP,1	
Q472	104.1	202.0	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
Q501	141.3	154.0	0501-000303	TR-SMALL SIGNAL	KSA733,PNP,TO-92,EBC	
Q502	212.7	138.5	0505-001181	FET-SILICON	IRF634A,N,250V,8.1A,450mohm,74	
Q503	270.0	126.6	0501-000122	TR-SMALL SIGNAL	2N3904,NPN,TO-92,EBC	
Q504	254.3	146.5	0505-001206	FET-SILICON	SSS6N90A,N,900V,24A,2.3ohm,50W	
Q506	289.6	170.0	0501-000303	TR-SMALL SIGNAL	KSA733,PNP,TO-92,EBC	
Q507	284.9	221.1	0501-000143	TR-SMALL SIGNAL	2N6520,PNP,625mW,TO-92,30-20	
Q509	164.8	146.3	0501-000581	TR-SMALL SIGNAL	2N3906,PNP,TO-92,EBC	
Q551	198.8	157.6	0501-000413	TR-SMALL SIGNAL	KSP44,NPN,625mW,TO-92,50-200	17"/16"
Q601	232.6	98.7	0501-000010	TR-SMALL SIGNAL	KSC1008,NPN,80V,60V,700mA,800m	
Q621	134.8	64.8	0501-000321	TR-SMALL SIGNAL	KSB1116-Y,PNP,0.75W,TO-92,13	
Q622	150.7	92.4	0501-000586	TR-SMALL SIGNAL	KSC945,NPN,TO-92,EBC	
Q623_M	304.6	79.7	0502-000249	TR-POWER	KSB772-Y,PNP,10W,TO-126,160-	M/MEDIA
Q624_M	309.6	88.3	0501-000586	TR-SMALL SIGNAL	KSC945,NPN,TO-92,EBC	M/MEDIA
R201	61.0	70.2	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R202	31.0	89.2	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R203	31.0	91.9	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R204	59.7	81.1	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R205	54.0	72.0	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	17"/16"
R206	48.5	68.8	2001-000738	R-CARBON	4.7Mohm,5%,1/6W,AA,TP,1.8x3.2m	
R207	37.8	73.9	2001-000001	R-CARBON	2Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R208	30.3	73.9	2001-000001	R-CARBON	2Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R209	32.8	73.8	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R210	51.4	71.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R211	59.4	97.5	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R212	26.9	77.7	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R213	21.5	58.6	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R214	18.7	44.6	2001-000496	R-CARBON	20Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R216	29.6	40.4	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R217	32.1	40.4	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R218	11.3	36.8	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R221	76.6	48.3	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R222	48.6	40.1	2001-000104	R-CARBON	1.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R223	24.6	31.3	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R226	34.8	26.1	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R227	37.6	26.1	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R231	51.3	26.1	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R232	53.8	26.0	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R234	40.2	26.1	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R236	64.3	95.8	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R237	66.9	84.9	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R238	66.6	82.2	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R240	66.5	45.8	2001-000464	R-CARBON	2.4Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R241	13.1	138.6	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R242	63.9	45.7	2001-000464	R-CARBON	2.4Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R243	13.0	108.3	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R244	17.0	72.1	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R246	46.0	40.1	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R247	60.3	40.8	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2m	
R248	79.4	79.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R249	34.5	81.6	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"/16"
			2001-000889	R-CARBON	6.8Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R250	66.2	30.8	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R301	93.9	66.8	2004-000252	R-METAL	11Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R302	109.0	70.8	2004-001022	R-METAL	5.6Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R303	101.3	77.5	2004-004180	R-METAL(S)	2ohm,1%,1/2W,AA,TP,2.4x6.4mm	17"SDD,Toshiba
			2004-001391	R-METAL(S)	2.2ohm,1%,1/2W,AA,TP,2.4x6.4mm	15"/16"
R304	119.5	68.7	2001-000109	R-CARBON(S)	470ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R306	110.1	46.3	2001-000245	R-CARBON(S)	1.5ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R307	113.5	44.2	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R308	92.0	63.5	2004-004144	R-METAL	2.64Kohm,1%,1/4W,AA,TP,2.4x6.4	
R309	91.7	58.6	2004-000970	R-METAL	470ohm,1%,1/4W,AA,TP,2.4x6.4mm	
R310	25.7	126.5	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R311	36.3	123.6	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R312	101.3	74.5	2004-004180	R-METAL(S)	2ohm,1%,1/2W,AA,TP,2.4x6.4mm	17"SDD,Toshiba
			2004-001391	R-METAL(S)	2.2ohm,1%,1/2W,AA,TP,2.4x6.4mm	15"/16"
R313	119.7	106.6	2001-000456	R-CARBON	2.2ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R314	116.6	68.7	2001-001153	R-CARBON(S)	47ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R321	92.6	140.2	2001-000976	R-CARBON	8.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R322	89.6	145.6	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R323	19.5	68.0	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R324	62.4	115.5	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R326	78.2	23.3	2003-000805	R-METAL OXIDE(S)	82ohm,5%,1W,AA,TP,3.3x9mm	
R327	112.4	25.9	2003-000805	R-METAL OXIDE(S)	82ohm,5%,1W,AA,TP,3.3x9mm	
R328	97.3	23.3	2001-000022	R-CARBON(S)	33ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R331	212.6	228.0	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R332	244.6	227.6	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R333	229.6	224.9	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R334	244.6	232.6	2001-001088	R-CARBON(S)	1Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R401	86.3	124.2	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R402	79.4	157.1	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R403	42.9	156.8	2004-004090	R-METAL	6.49Kohm,1%,1/4W,AA,TP,2.5x6.5	
R404	51.8	163.5	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R405	56.6	163.0	2001-000100	R-CARBON	2.2Mohm,5%,1/6W,AA,TP,1.8x3.2m	
R406	68.5	171.0	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	17"/16"
R407	65.3	180.9	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	17"/16"
R408	47.2	179.9	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R409	37.8	167.6	2001-000093	R-CARBON	470Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R410	61.6	165.6	2001-000457	R-CARBON	2.2ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R411	31.0	167.0	2001-000082	R-CARBON	68Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"/16"
			2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R412	36.1	160.6	2001-000097	R-CARBON	1Mohm,5%,1/6W,AA,TP,1.8x3.2mm	17"
			2001-000086	R-CARBON	100Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"/16"
R413	37.4	181.6	2001-000496	R-CARBON	20Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"/16"
R414	16.5	163.8	2001-000082	R-CARBON	68Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
			2001-000075	R-CARBON	39Kohm,5%,1/6W,AA,TP,1.8x3.2mm	16"
			2001-000079	R-CARBON	56Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R415	61.9	162.6	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
			2001-000976	R-CARBON	8.2Kohm,5%,1/6W,AA,TP,1.8x3.2mm	16"
R416	15.4	169.5	2001-000082	R-CARBON	68Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"
			2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	16"
			2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R417	25.9	175.6	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	17"
			2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	16"
			2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R418	23.4	172.3	2001-000923	R-CARBON	680ohm,5%,1/6W,AA,TP,1.8x3.2mm	17"/16"
			2001-000652	R-CARBON	330ohm,5%,1/6W,AA,TP,1.8x3.2mm	15"
R419	32.9	146.8	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R420	75.3	165.3	2004-000458	R-METAL	2.2Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R421	48.9	130.5	2001-000044	R-CARBON	1.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R422	53.8	130.5	2001-000044	R-CARBON	1.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R423	60.7	122.0	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R424	63.0	122.0	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R425	64.3	168.2	2004-000698	R-METAL	3.3Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R426	97.2	206.6	2001-000016	R-CARBON(S)	1ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R430	35.4	227.2	2001-001152	R-CARBON(S)	47Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R431	81.0	177.1	2001-000019	R-CARBON(S)	10ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R432	91.9	203.5	2003-000400	R-METAL OXIDE(S)	0.5ohm,5%,2W,AA,TP,4x12mm	17"/16"
			2003-000407	R-METAL OXIDE(S)	0.6ohm,5%,2W,AA,TP,4x12mm	15"
R433	116.2	198.9	2003-000428	R-METAL OXIDE(S)	1.5Kohm,5%,1W,AA,TP,3.3x9mm	
R434	37.4	184.3	2001-000678	R-CARBON	36Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R435	64.8	227.9	2001-001152	R-CARBON(S)	47Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R436	30.9	187.2	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R440	75.8	216.1	2001-001152	R-CARBON(S)	47Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R441	84.8	158.7	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R442	101.3	166.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R443	121.1	168.9	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2m	
R444	135.7	180.9	2003-000595	R-METAL OXIDE(S)	240ohm,5%,2W,AA,TP,4x12mm	17"
			2003-000272	R-METAL OXIDE(S)	330ohm,5%,2W,AA,TP,4x12mm	16"
			2003-000644	R-METAL OXIDE(S)	300ohm,5%,2W,AA,TP,4x12mm	15"
R446	139.9	165.8	2001-001078	R-CARBON(S)	15Kohm,5%,1/2W,AA,TP,2.4x6.4mm	
R447	131.9	175.4	2001-001155	R-CARBON(S)	5.6Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R448	165.5	176.2	2003-000422	R-METAL OXIDE(S)	1.2ohm,5%,2W,AA,TP,4x12mm	17"/16"
			2003-000005	R-METAL OXIDE(S)	1ohm,5%,2W,AA,TP,4x12mm	15"
R449	187.2	181.0	2001-000020	R-CARBON(S)	22ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R451	118.8	233.2	2001-000019	R-CARBON(S)	10ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R453	149.4	238.7	2003-000009	R-METAL OXIDE(S)	220ohm,5%,1W,AA,TP,3.3x9mm	
R461	53.3	206.5	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R462	57.7	200.7	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R463	50.6	208.4	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R464	47.7	201.6	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R465	41.9	208.2	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R466	39.2	201.6	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R467	149.4	233.7	2003-000767	R-METAL OXIDE(S)	680ohm,5%,2W,AA,TP,4x12mm	
R471	96.5	132.1	2001-000069	R-CARBON	12Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R472	100.5	170.4	2001-000108	R-CARBON	18Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R473	93.9	173.2	2003-000349	R-METAL OXIDE	62ohm,5%,2W,AA,TP,6x16mm	
R477	110.1	195.5	2003-000349	R-METAL OXIDE	62ohm,5%,2W,AA,TP,6x16mm	
R478	134.0	214.1	2001-000107	R-CARBON(S)	150Kohm,5%,1/2W,AA,TP,2.4x6.4m	
R501	163.3	166.6	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R502	158.4	149.3	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R503	126.2	124.5	2004-000515	R-METAL	200Kohm,1%,1/4W,AA,TP,2.4x6.4m	17"/16"
			2004-000315	R-METAL	140Kohm,1%,1/4W,AA,TP,2.4x6.4m	15"
R504	127.3	153.1	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R505	44.9	21.9	2004-000432	R-METAL	1Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R506	137.7	134.5	2001-000097	R-CARBON	1M ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R507	131.1	127.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R508	205.9	131.5	2001-001038	R-CARBON(S)	0.56ohm,5%,1/2W,AA,TP,2.4x6.4m	
R509	209.1	131.6	2001-001038	R-CARBON(S)	0.56ohm,5%,1/2W,AA,TP,2.4x6.4m	
R510	63.6	23.7	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R511	140.2	134.5	2001-000072	R-CARBON	22Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R512	145.8	128.0	2001-000889	R-CARBON	6.8Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R513	148.6	149.8	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R514	171.0	144.0	2001-000456	R-CARBON	2.2ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R516	202.8	138.8	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R517	144.8	148.5	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R518	132.8	150.6	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R519	129.7	137.1	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R521	223.4	135.3	2003-000428	R-METAL OXIDE(S)	1.5Kohm,5%,1W,AA,TP,3.3x9mm	
R522	232.5	145.0	2004-000327	R-METAL	150Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R524	253.6	118.6	2001-001178	R-CARBON(S)	680ohm,5%,1/2W,AA,TP,2.4x6.4mm	
			2001-000109	R-CARBON(S)	470ohm,5%,1/2W,AA,TP,2.4x6.4mm	16"
R525	248.3	129.5	2001-000110	R-CARBON	10ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R526	129.7	153.9	2001-000057	R-CARBON	5.1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R527	292.6	139.9	2001-000073	R-CARBON	33Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R528	69.4	31.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R529	302.1	188.8	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R530	291.7	173.1	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R531	275.9	205.3	2001-000432	R-CARBON	1M ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R532	272.9	231.0	2004-000327	R-METAL	150Kohm,1%,1/4W,AA,TP,2.4x6.4m	17"
			2004-000604	R-METAL	240Kohm,1%,1/4W,AA,TP,2.4x6.4m	16"
			2004-000262	R-METAL	120Kohm,1%,1/4W,AA,TP,2.4x6.4m	15"
R533	275.8	219.9	2001-000962	R-CARBON	75Kohm,5%,1/4W,AA,TP,2.4x6.4mm	16"/17", SDD
			2001-000317	R-CARBON	120Kohm,5%,1/4W,AA,TP,2.4x6.4mm	15"
R534	267.8	239.0	2001-000546	R-CARBON	270Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R540	114.7	144.5	2001-000367	R-CARBON	15Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R541	113.4	163.7	2004-004232	R-METAL	249Kohm,1%,1/4W,AA,TP,2.5x6.5m	17"
			2004-000604	R-METAL	240Kohm,1%,1/4W,AA,TP,2.4x6.4m	16"
			2004-000643	R-METAL	270Kohm,1%,1/4W,AA,TP,2.5x6.5m	15"

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R542	94.4	161.6	2004-001040	R-METAL	50Kohm,1%,1/4W,AA,TP,2.4x6.4mm	17"/16"
			2004-004145	R-METAL	52Kohm,1%,1/4W,AA,TP,2.4x6.4mm	15"
R543	101.8	133.1	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R544	93.9	133.1	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R545	110.5	124.4	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R546	113.0	107.6	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R547	111.7	135.5	2001-000562	R-CARBON	27Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R548	263.3	218.7	2003-000683	R-METAL OXIDE(S)	4.7Kohm,5%,1W,AA,TP,3.3x9mm	17"
R549	286.5	125.9	2001-000060	R-CARBON	6.8Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R550	286.5	122.8	2001-001178	R-CARBON(S)	680ohm,5%,1/2W,AA,TP,2.4x6.4mm	
			2001-001163	R-CARBON(S)	560ohm,5%,1/2W,AA,TP,2.4x6.4mm	16"
R551	201.5	120.3	2001-000055	R-CARBON	4.7Kohm,5%,1/4W,AA,TP,2.4x6.4m	17"/16"
R552	207.6	159.3	2001-000105	R-CARBON	1.5Kohm,5%,1/4W,AA,TP,2.4x6.4m	17"/16"
R553	216.6	166.4	2001-001110	R-CARBON(S)	240Kohm,5%,1/2W,AA,TP,2.4x6.4m	17"/16"
R554	207.3	192.4	2001-001129	R-CARBON(S)	330Kohm,5%,1/2W,AA,TP,2.4x6.4m	17"/16"
R556	191.2	155.5	2001-000611	R-CARBON	3.9Kohm,5%,1/4W,AA,TP,2.4x6.4m	17"/16"
R557	16.2	58.6	2001-000074	R-CARBON	33Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R558	296.8	135.5	2001-000211	R-CARBON	1ohm,5%,1/4W,AA,TP,2.4x6.4mm	
R559	234.1	122.8	2004-000716	R-METAL	3.6Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R560	43.0	40.7	2004-001285	R-METAL	820ohm,1%,1/4W,AA,TP,2.4x6.4mm	
R601	292.9	31.2	2001-000642	R-CARBON	330Kohm,5%,1/2W,AA,TP,3.3x9mm	
R602	224.9	90.4	2001-000023	R-CARBON	47ohm,5%,1/4W,AA,TP,2.4x6.4m	
R603	222.2	98.0	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R604	230.0	40.9	2003-002090	R-METAL OXIDE(S)	180Kohm,5%,2W,AA,TP,12x4.3mm	
R605	195.2	34.3	2003-000738	R-METAL OXIDE(S)	56Kohm,5%,2W,AA,TP,4x12mm	
R606	199.6	49.9	2001-001079	R-CARBON(S)	15ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R608	194.6	82.1	2001-001114	R-CARBON(S)	270ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R609	187.9	15.4	2001-000044	R-CARBON	1.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
R611	195.4	58.1	2003-000756	R-METAL OXIDE(S)	6.8Kohm,5%,3W,AA,TP,6x16mm	
R621	101.1	90.7	2001-000988	R-CARBON	820Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R622	104.0	122.3	2001-001138	R-CARBON(S)	390ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R623	137.9	63.6	2001-000077	R-CARBON	47Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R624	146.9	76.3	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R625	148.2	95.1	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R626	151.6	49.2	2003-000471	R-METAL OXIDE(S)	10ohm,5%,2W,AA,TP,4x12mm	
R627	162.2	17.5	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R628	162.2	15.0	2004-000150	R-METAL	1.5Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R629	145.2	20.3	2004-000947	R-METAL	43Kohm,1%,1/4W,AA,TP,2.4x6.4mm	
R630	145.3	17.3	2004-000481	R-METAL	2.4Kohm,1%,1/4W,AA,TP,2.4x6.4m	
R631	147.6	23.2	2001-000060	R-CARBON	6.8Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R632	137.9	29.7	2001-000495	R-CARBON	20Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
R633	211.4	121.6	2003-000407	R-METAL OXIDE(S)	0.6ohm,5%,2W,AA,TP,4x12mm	17"
			2001-001037	R-CARBON(S)	0.39ohm,5%,1/2W,AA,TP,2.4x6.4mm	16"
			2003-000005	R-METAL OXIDE(S)	1ohm,5%,2W,AA,TP,4x12mm	15"
R634	176.3	87.3	2003-000330	R-METAL OXIDE(S)	560ohm,5%,1W,AA,TP,3.3x9mm	
R635	145.3	14.3	2001-000593	R-CARBON	3.3M ohm,5%,1/4W,AA,TP,2.4x6.4m	
R636_M	302.6	104.4	2003-000631	R-METAL OXIDE(S)	3.3ohm,5%,3W,AA,TP,6x16mm	M/MEDIA

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R637_M	299.6	102.9	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	M/MEDIA
R638_M	312.8	84.1	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2m	M/MEDIA
R639_M	306.2	102.9	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2m	M/MEDIA
RL601	285.0	82.9	3501-001111	RELAY-POWER	12Vdc,250mW,5A,1FormA,15mS,5mS	
SK501	241.5	220.7	4715-000001	SURGE ABSORBER	1KV,+50-10%	17"/16"
SW201	7.0	148.5	3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW202	7.0	131.5	3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW203	7.0	120.5	3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW204	7.0	103.5	3404-000244	SWITCH-TACT	15V,20mA,90-170gf,7.5x7mm,SPST	
SW451	145.5	239.5	3406-000002	SWITCH-TOGGLE	SWITCH-TOGGLE,SP3T	
SW601	192.5	10.0	3403-001050	SWITCH-PUSH	30V,0.3A,SPDT,ON-OFF,PC BORD T	
T401	155.2	164.5	BH26-30338L	TRANS-HOR.DRIVE	50mH/84uH/34uH,7P,EI1916,PL3,5	
T402	156.7	187.8	BH26-30338M	TRANS-HOR.PULSE	1.5mH/1.1uH/1.1uH,10P,EER2828	
T403	165.8	229.4	BH26-30338N	TRANS-H.LINEARITY	85mH/4.0uH,6P,DR1415(C:4.9),L-	
T501	246.0	175.7	BH26-10336B	TRANS-FBT	780UH,15P,HV45UR	17"/16"
			BH26-10336H	TRANS-FBT	0.76MH,13P,HV22UR	15"
T502	294.1	194.9	BH26-30338T	TRANS-FOCUS	2.0mH/50.0uH,7P,EE1916,PL-3,2.	17"
			BH26-30338V	TRANS-FOCUS	2.0mH/192mH,EE1916,PL-3.2	16"
T601	183.5	29.8	BH26-20336G	TRANS-POWER	390uH/89.0uH,16P,EER3541,PL-3	
			BH26-20336H	TRANS-POWER	360uH/18P,EER3942,PL-3,7.0uH	M/M
T602	197.3	87.4	BH26-30302S	TRANS-SYNC.	3-1(250UH),SB-5S,UU1116,3-	
TH601	268.7	57.7	1404-000002	THERMISTOR-NTC	9OHM,20%	
TH602	232.2	66.9	1404-001020	THERMISTOR-NTC	8ohm,15%,17mW/C,BK	
X201	47.3	65.3	2801-000724	CRYSTAL	6MHz,20ppm,28-AMM,20pF,40ohm	
ZD501	135.7	148.4	0403-000355	DIODE-ZENER	UZ5.1BSB,5.1V,4.97-5.18V,500mW	

9-2 Video PCB Parts

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C101	46.4	90.9	2401-000037	C-AL	470uF,20%,16V,GP,8x11.5mm,5mm	
C102	30.7	61.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C103	46	88	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C104	91.6	16.3	2401-000010	C-AL	220uF,20%,16V,GP,6.3x11mm,2.5m	
C106	62.7	37.2	2401-000031	C-AL	47uF,20%,16V,GP,6.3x11mm,5mm,T	
C113	27	16.5	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C114	18.1	17.4	2301-000013	C-FILM,PEF	4.7nF,5%,100V,10.5x12.5x6.5,5m	
C115	20	23.3	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C116	30.8	11.5	2301-000015	CAP-MYLAR	10nF,2A,5P,(T)100V 103J	
C117	22.9	10.8	2401-000025	C-AL	100uF,20%,16V,GP,8x11.5mm,3.5m	
C118	45	10.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C119	34.3	38.8	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C120	29.8	40.5	2401-000042	C-AL	100uF,(T)16V 100M	
C121	78.5	47.5	2301-000015	CAP-MYLAR	10nF,2A,5P,(T)100V 103J	
C122	58.9	19.2	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
C124	70.3	66.7	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
C125	51.8	85.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C126	94.6	55.2	2401-001459	C-AL	47uF,20%,100V,GP,10x16mm,5mm,T	
C128	78	15.6	2202-002008	C-CERAMIC,MLC-AXIAL	10nF,+80-20%,50V,Y5V,2.3X3.0	
C129	67.1	21	2301-000012	C-FILM,PEF	2.2nF,5%,100V,10.5x12.5x6.5,5m	
C130	38	23.3	2301-000015	CAP-MYLAR	10nF,2A,5P,(T)100V 103J	
CB01	21.9	56.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CB04	63	57.6	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CB05	107.8	77.9	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
CB06	113	39.3	2401-001334	C-AL	470nF,20%,50V,GP,5x11mm,2mm,TP	
CB07	113.6	30.6	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
CG01	23	69.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CG04	56	71.4	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CG05	99.5	77.9	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
CG06	100	41.6	2401-001334	C-AL	470nF,20%,50V,GP,5x11mm,2mm,TP	
CG07	101.4	25.6	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
CG08	90.3	58.1	2201-000010	C-CERAMIC,DISC	33pF,5%,50V,NPO,5x3.5,5,TP	
CN101	11	72.7	3711-004087	CONNECTOR-HEADER	BOX,13P,1R,2mm,ANGLE,SN	
CN103	58.7	93.3	3711-004015	CONNECTOR-HEADER	BOX,8P,1R,2.50mm,ANGLE,SN	
CN104	50.4	10.5	3710-001180	CONNECTOR-SOCKET	22P,1R,2.54mm,ANGLE,AU	
CR01	21.8	77.9	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CR04	49.3	88.5	2202-002009	C-CERAMIC,MLC-AXIAL	100nF,+80-20%,50V,Y5V,2.3X3.0	
CR05	91.1	77.9	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
CR06	84.5	39.3	2401-001334	C-AL	470nF,20%,50V,GP,5x11mm,2mm,TP	
CR07	88.8	28.8	2401-000043	C-AL	1uF,20%,160V,GP,6.3x11mm,5mm,T	
D101	84.8	13.7	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D102	71.1	55.2	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D103	41.3	22.2	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D104	78.1	28.4	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D105	72.8	23.6	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
D106	22.3	53.9	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DB01	14.8	66.6	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
DB02	22.8	64.1	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DB03	106.1	73.2	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DB04	108.4	66.9	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DB05	116	74.8	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DG01	15	72.5	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DG02	23	75.1	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DG03	100.9	73.3	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DG04	103.7	91.6	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DG05	113.5	74.8	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DR01	12.5	83.2	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DR02	22.5	85.6	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
DR03	95.7	73.2	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DR04	95.3	91.7	0401-000006	DIODE-SIG	BAV21,DO-35,250V,250MA,1V,100MA	
DR05	111	74.8	0401-000005	DIODE-SIG	1N4148,DO-35,75V,150MA,1V,10MA	
HS1	63.9	62.9	BH62-30410A	HEAT/SINK	A6063S,T2.5,CGH7609	
IC101	34.3	84.2	1201-001332	IC-VIDEO AMP	2506,DIP,28P,600MIL,SINGLE,P	
IC102	84.5	54.3	BH13-10335R	IC-HYBRID	CYGNUS,LM2407,SIP,11P,CRT DRIV	
IC104	20.4	27.4	BH09-10304H	IC-OSD PROCESSOR	HB-CHASSIS,LSC4520P2,16P,EN/FR	
L101	44	20.1	2701-000125	INDUCTOR-AXIAL	150uH,10%,2.8x7mm	
Q102	49.7	14.5	0501-000492	TR-SMALL SIGNAL	MPS3646,NPN,TO-92,EBC	
Q103	82	15.6	0501-000122	TR-SMALL SIGNAL	2N3904,NPN,625mW,TO-92,100-3	
QB01	105	31.8	0501-000140	TR-SMALL SIGNAL	2N5551,NPN,625mW,TO-92,80-25	
QB02	114.4	48.5	0501-000138	TR-SMALL SIGNAL	2N5401,PNP,625mW,TO-92,TP,60-2	
QG01	98.3	31.7	0501-000140	TR-SMALL SIGNAL	2N5551,NPN,625mW,TO-92,80-25	
QG02	106.4	45.8	0501-000138	TR-SMALL SIGNAL	2N5401,PNP,625mW,TO-92,TP,60-2	
QR01	85.8	31.2	0501-000140	TR-SMALL SIGNAL	2N5551,NPN,625mW,TO-92,80-25	
QR02	92.6	43.9	0501-000138	TR-SMALL SIGNAL	2N5401,PNP,625mW,TO-92,TP,60-2	
R101	60.1	22.3	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R102	60.1	24.7	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R103	6.3	36.1	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R104	116.7	56.9	2003-000276	R-METAL OXIDE	33ohm,5%,1W,AA,TP,4.3x12mm	
R106	76	35.9	2001-000056	R-CARBON	4.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R107	46.8	39.3	2001-000048	R-CARBON	2.2Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R108	115.1	20.3	2003-000704	R-METAL OXIDE(S)	47Kohm,5%,1W,AA,TP,3.3x9mm	
R109	47.9	46.2	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R110	48.9	43.8	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R111	16.6	14.4	2001-000046	R-CARBON	1.8Kohm,5%,1/6W,AA,TP,1.8x3.3mm	
R112	45	13	2001-000106	R-CARBON	1.5Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R114	26.3	20.3	2001-000059	R-CARBON	5.6Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R116	56.1	19.7	2001-000051	R-CARBON	2.7Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R118	64.6	15.5	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R119	78	18.4	2001-000053	R-CARBON	3.3Kohm,5%,1/6W,AA,TP,1.8x3.2m	
R120	67.1	33.4	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R122	76.1	30.9	2001-000043	R-CARBON	1Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R123	64.3	27.2	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R124	87.2	13.7	2001-000067	R-CARBON	10Kohm,5%,1/6W,AA,TP,1.8x3.2mm	
R126	28.7	19.3	2001-000097	R-CARBON	1Mohm,5%,1/6W,AA,TP,1.8x3.2mm	

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
R127	9	36.1	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
R128	11.7	36.1	2001-000868	R-CARBON	56ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB01	14.7	58.8	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB02	14.6	61.4	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB04	63	60.3	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB05	55.9	62.7	2001-000301	R-CARBON	10ohm,5%,1/6W,AA,TP,1.8x3.2m	
RB06	103.5	60.3	2001-000027	R-CARBON	100ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RB07	78.8	77.3	2001-000962	R-CARBON	75Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
RB09	108.9	37.5	2001-000047	R-CARBON	2.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
RB10	56.1	49.6	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RB15	100.4	53	2001-000115	R-CARBON	82Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
RG01	15.7	77.4	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG02	14.2	69.5	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG04	63	66.1	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG05	55.9	68.6	2001-000301	R-CARBON	10ohm,5%,1/6W,AA,TP,1.8x3.2m	
RG06	98.4	60.3	2001-000027	R-CARBON	100ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RG07	82.5	76.3	2001-000962	R-CARBON	75Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
RG08	87.5	71	2001-000484	R-CARBON	200Kohm,5%,1/6W,AA,TP,1.8x3.2m	
RG09	93.4	34.8	2001-000047	R-CARBON	2.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
RG10	56.1	52.2	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RG15	100.1	50.1	2001-000115	R-CARBON	82Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
RR01	12.6	88.2	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR02	14.6	80.6	2001-000026	R-CARBON	75ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR04	63	76.6	2001-000040	R-CARBON	470ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR05	56	74.2	2001-000301	R-CARBON	10ohm,5%,1/6W,AA,TP,1.8x3.2m	
RR06	92.9	60.2	2001-000027	R-CARBON	100ohm,5%,1/4W,AA,TP,2.4x6.4mm	
RR07	86.1	75.5	2001-000962	R-CARBON	75Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
RR09	79.6	43.2	2001-000047	R-CARBON	2.2Kohm,5%,1/4W,AA,TP,2.4x6.4m	
RR10	56	54.8	2001-000029	R-CARBON	100ohm,5%,1/6W,AA,TP,1.8x3.2mm	
RR15	88.4	51.2	2001-000115	R-CARBON	82Kohm,5%,1/4W,AA,TP,2.4x6.4mm	
ZD101	22.2	45.8	0403-000005	DIODE-ZEN	UZ-5.1B,DO-35,0.5W,10MA	
ZD102	22.3	48.5	0403-000005	DIODE-ZEN	UZ-5.1B,DO-35,0.5W,10MA	
ZD103	22.3	51.3	0403-000005	DIODE-ZEN	UZ-5.1B,DO-35,0.5W,10MA	
ZD105	22.2	43.1	0403-000005	DIODE-ZEN	UZ-5.1B,DO-35,0.5W,10MA	

9-3 Control PCB Parts (17"/16")

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C181	34.3	43.2	2201-000021	C-CERAMIC,DISC	100nF,+80-20%,50V,Y5V,8x3,5,TP	
C182	66.4	25.6	2201-000530	C-CERAMIC,DISC	4.7nF,10%,500V,Y5P,12.5x4,5,TP	
C183	63.2	49.6	2201-000022	C-CERAMIC,DISC	2.7nF,0.1,2KV,Y5P,18.5x6,10,BK	
CN103	8.1	17	BH39-40365Y	CONNECTOR-HEADER	ASS'Y 9P,1R,2.50mm	
CN12	64	41	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN13	9.7	62.9	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN14	72.1	63.2	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
LB01	22	23.7	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
LG01	13.4	23.7	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
LR01	17.6	23.8	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
R181	54.8	65.1	2001-001107	R-CARBON(S)	220ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R182	68	49.6	2001-001138	R-CARBON(S)	390ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RB17	26.4	32.9	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
RG17	54.8	61.5	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
RR17	33.9	52.6	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
SK1	47.3	30	3704-001014	SOCKET-CRT	12P,22.5PI,26.5PI	
SK101	51.9	48.2	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK102	71.2	30.2	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK103	30.7	33	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK104	62.4	25.6	4715-000106	SURGE ABSORBER	300V,20%,1000A,RADIAL	

9-3 Control PCB Parts (15")

Loc. No.	Coordinates (X,Y)		Code No.	Description	Specification	Remarks
C181	37.7	46.1	2201-000021	C-CERAMIC,DISC	100nF,+80-20%,50V,Y5V,8x3,5,TP	
C182	66.2	18.5	2201-000530	C-CERAMIC,DISC	4.7nF,10%,500V,Y5P,12.5x4,5,TP	
C183	59	42	2201-000022	C-CERAMIC,DISC	2.7nF,0.1,2KV,Y5P,18.5x6,10,BK	
CN103	7.9	21.5	BH39-40365Y	CONNECTOR-HEADER	ASS'Y 9P,1R,2.50mm	
CN12	64	41	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN13	9.7	62.9	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
CN14	72.1	63	BH71-40300A	PIN-HINGE	BRASS,D2.36,SN,HEAT/SINK	
LB01	23.8	34.6	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
LG01	14.5	30.8	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
LR01	19	30.9	2701-000190	INDUCTOR-AXIAL	470nH,20%,4x9.8mm	
R181	58.6	64.6	2001-001107	R-CARBON(S)	220ohm,5%,1/2W,AA,TP,2.4x6.4mm	
R182	54.8	32.3	2001-001138	R-CARBON(S)	390ohm,5%,1/2W,AA,TP,2.4x6.4mm	
RB17	28.1	40	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
RG17	54.6	25.4	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
RR17	46.9	57.6	2001-000705	R-CARBON	39ohm,5%,1/2W,AA,TP,3.3x9mm	
SK1			3704-001088	SOCKET-CRT	13P,22.5PI,25.6PI	
SK101	50.5	41.9	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK102	57.6	22.6	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK103	31.8	42.2	4715-000102	SURGE ABSORBER	200V,20%,1000A,RADIAL	
SK104	53.7	20.2	4715-000106	SURGE ABSORBER	300V,20%,1000A,RADIAL	
SK105	39.5	29.4	3704-001088	SOCKET-CRT	13P,22.5PI,25.6PI,SN	
SK106	55	43.8	4715-000001	SURGE ABSORBER	1KV,+50-10%	

Others

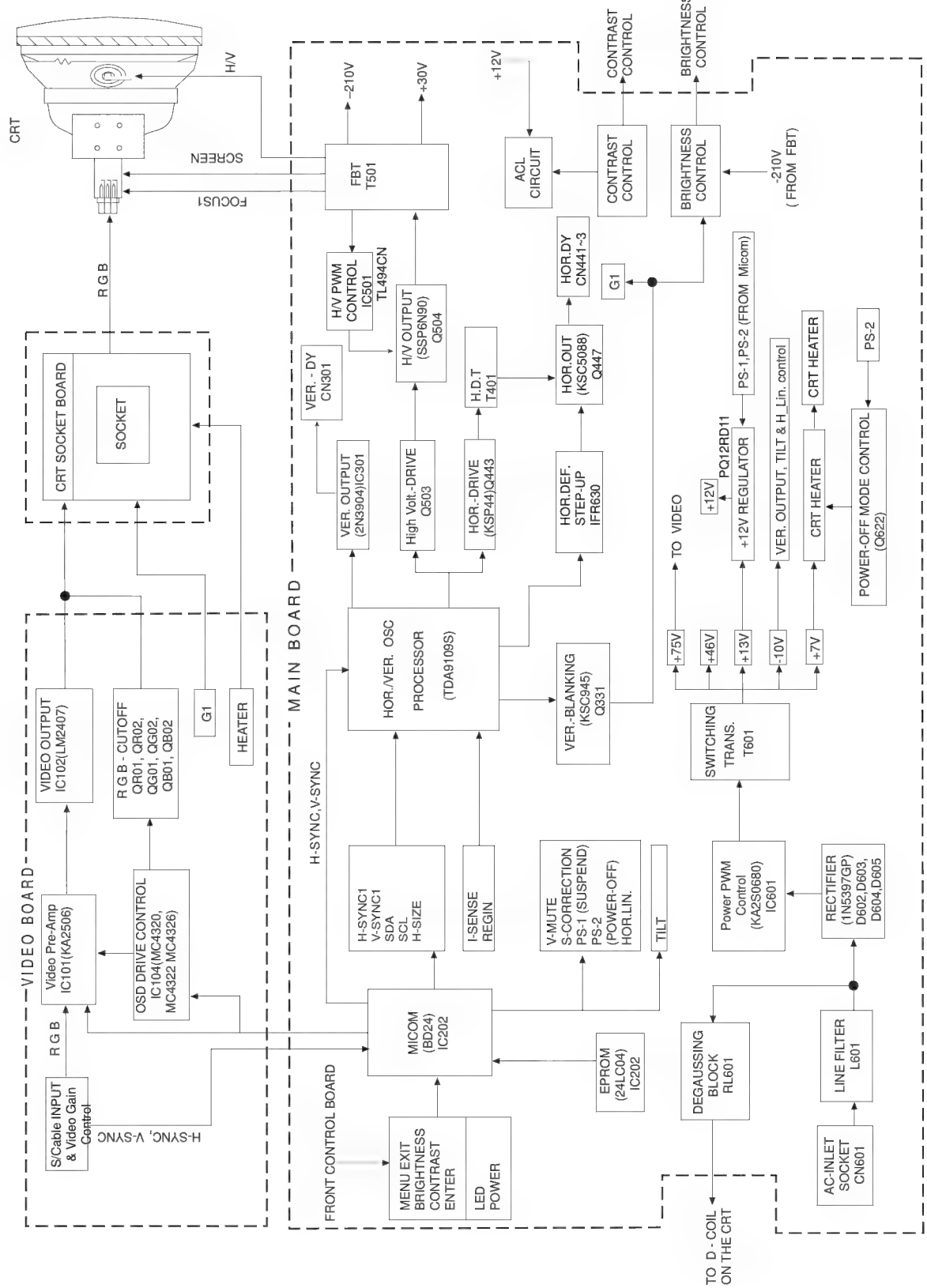
Loc. No.	Code No.	Description	Specification	Remarks
⚠ CRT	BH03-10337X	CRT-COLOR	15",0.28,M36KUK35X02(T4/LP)	15" SDD
	BH03-10338V	CRT-COLOR	15",0.28,M36KUK35X02(A/LP)	15" SDD
	BH03-10338R		15",0.28,M36KUK35X02(M/E/LP)	
	BH03-10338S		15",0.28,M36KUK35X02(R/E/LP)	
	BH03-10341N		16",0.28,M38QCL361X111	
	BH03-10340F	CRT-COLOR	17",0.28,M41KUN36X03(T4/S2)	17" SDD
	BH03-10337U	CRT-COLOR	17",0.28,M41KUN36X03(A/L/LP)	
	BH03-10340D	CRT-COLOR	17",0.28,M41KUN36X03(M/A/L/LP)	
	BH03-10339J	CRT-COLOR	17",0.28,M41KUN36X03(R/A/L/LP)	
	BH03-10337V	CRT-COLOR	17",0.28,M41KUN36X03(T4/L/LP)	
CRT GND	BH39-40365Z	CBF-CRT GROUND	1P,BLK,UL1015,AWG18,YFH800_0	17"/16"
	BH39-40366A	CBF-CRT GROUND	1P,BLK,UL1015,AWG18,YFH800_0	15"
D-COIL	BH27-10336G	DEGAUSSING COIL	290*300*1070MM,9.8MH,26.5OHM	17"/16"
	BH27-10336B	DEGAUSSING COIL	300*240*1060MM,7.2MH,22.5OHM	15"
S/CABLE	BH39-20337W	CBF-SIGNAL	ATT,1500MM,15P/13,IVORY,UL2990	
PROCESS-PWA UNIT	BH94-30017L	ASS'Y, PCB	CHB5237L	
	BH94-30016A	ASS'Y, PCB	CHB5707L	
	BH94-30017V	ASS'Y, PCB	CHB5707L	
	BH94-30016U	ASS'Y, PCB	CHB6107L	
	BH94-30017S	ASS'Y, PCB	CHB7227L	
	BH94-30016B	ASS'Y, PCB	CHB7707L	
	BH94-30017P	ASS'Y, PCB	CHB7227L	
	BH94-30016Y	ASS'Y, PCB	CHB7707L	
	BH94-30017U	ASS'Y, PCB	CHB7227L	
B/D ASS'Y	BH98-10016Q	ASS'Y, PCB/MAIN	CHB5237L	
	BH98-10015K	ASS'Y, PCB/MAIN	CHB5707L	
	BH98-10016X	ASS'Y, PCB/MAIN	CHB5707L	
	BH98-10016A	ASS'Y, PCB/MAIN	CHB6107L	
	BH98-10016V	ASS'Y, PCB/MAIN	CHB7227L	
	BH98-10015L	ASS'Y, PCB/MAIN	CHB7707L	
	BH98-10016T	ASS'Y, PCB/MAIN	CHB7227L	
	BH98-10016D	ASS'Y, PCB/MAIN	CHB7707L	
	BH98-10016Y	ASS'Y, PCB/MAIN	CHB7227L	
	BH98-20006N	ASS'Y, PCB/VIDEO	CHB5237L	
	BH98-20005Y	ASS'Y, PCB/VIDEO	CHB5707L	
	BH98-20006S	ASS'Y, PCB/VIDEO	CHB5707L	
	BH98-20006H	ASS'Y, PCB/VIDEO	CHB6107L	

Others Continued

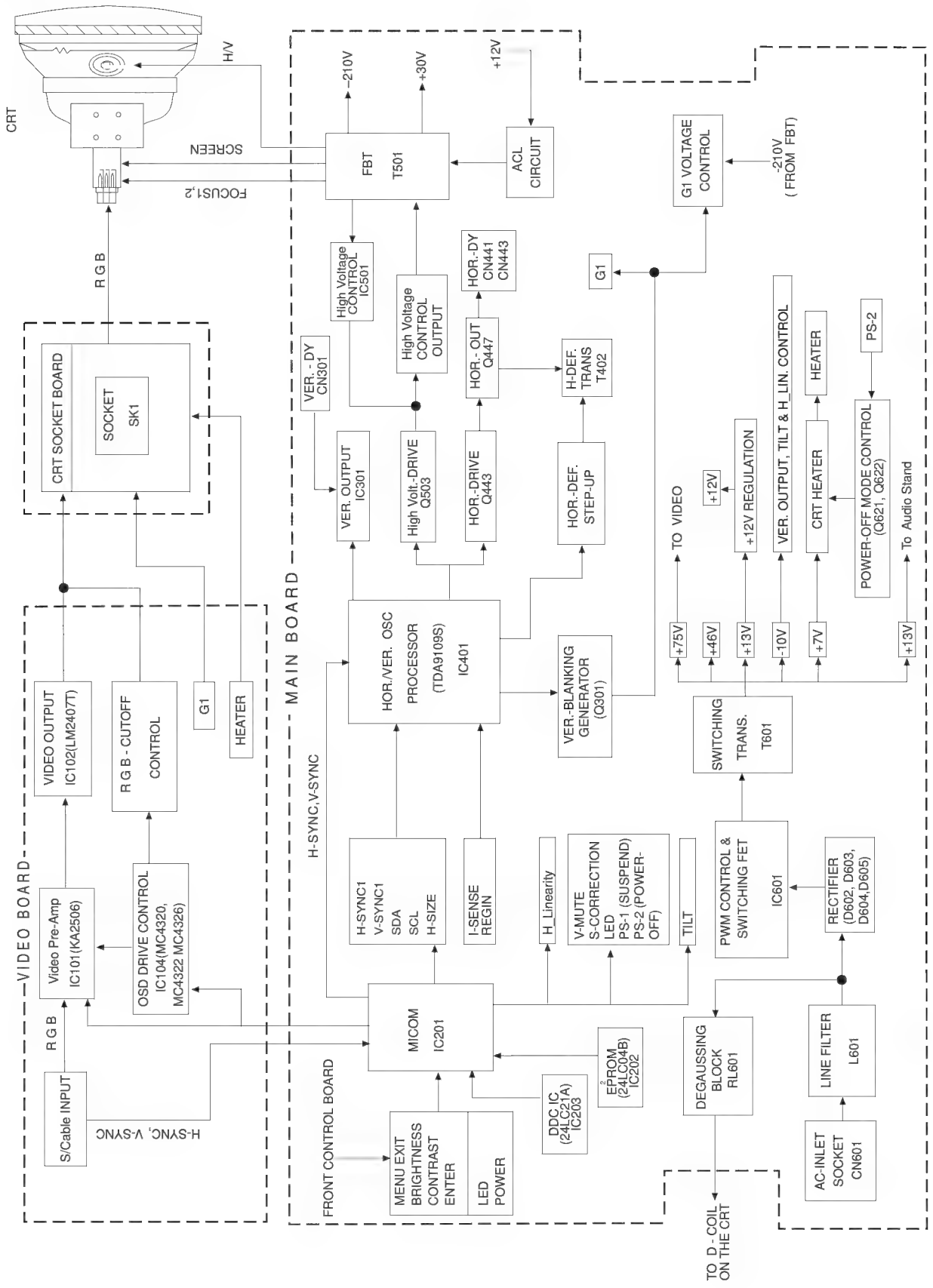
Loc. No.	Code No.	Description	Specification	Remarks
B/D ASS'Y	BH98-20006Q	ASS'Y, PCB/VIDEO	CHB7227L	
	BH98-20005Z	ASS'Y, PCB/VIDEO	CHB7707L	
	BH98-20006P	ASS'Y, PCB/VIDEO	CHB7227L	
	BH98-20006K	ASS'Y, PCB/VIDEO	CHB7707L	
	BH98-20006R	ASS'Y, PCB/VIDEO	CHB7227L	
	BH98-60002B	ASS'Y, PCB/SOCKET	CHB5237L	
	BH98-60002D	ASS'Y, PCB/SOCKET	CHB5707L	
	BH98-60002H	ASS'Y, PCB/SOCKET	CHB6107L	
	BH98-60002A	ASS'Y, PCB/SOCKET	CHB7227L	
	BH98-60002E	ASS'Y, PCB/SOCKET	CHB7707L	
AUDIO STAND ASS'Y	BH59-70001A	UNIT/STAND-AMP	3W,500MW,240HZ,50DB	M/M, 15"
	BH59-70002A	UNIT/STAND-AMP	3W,500MW,240HZ,50DB	M/M, 16"/17"
P/CORD	BH39-10339Z	CBF-POWER/CORD	DET,RVV3,250V/10A.BLK,18	CHINA
	BH39-10005A	CBF-POWER/CORD	CAP,1200MM,250V/10A,IVY	UK,THAILAND
	BH39-10007A	CBF-POWER/CORD	WALL,1830MM,250V/6A,IVY	SEG,SESA,SEF
	BH39-10339E	CBF-POWER/CORD	DET,SVT,125V 7A/10A,IVY	SEA,SECA
	BH39-10006A	CBF-POWER/CORD	WALL,1830MM,250V/10A,IVY	SEAU

10 Block Diagrams

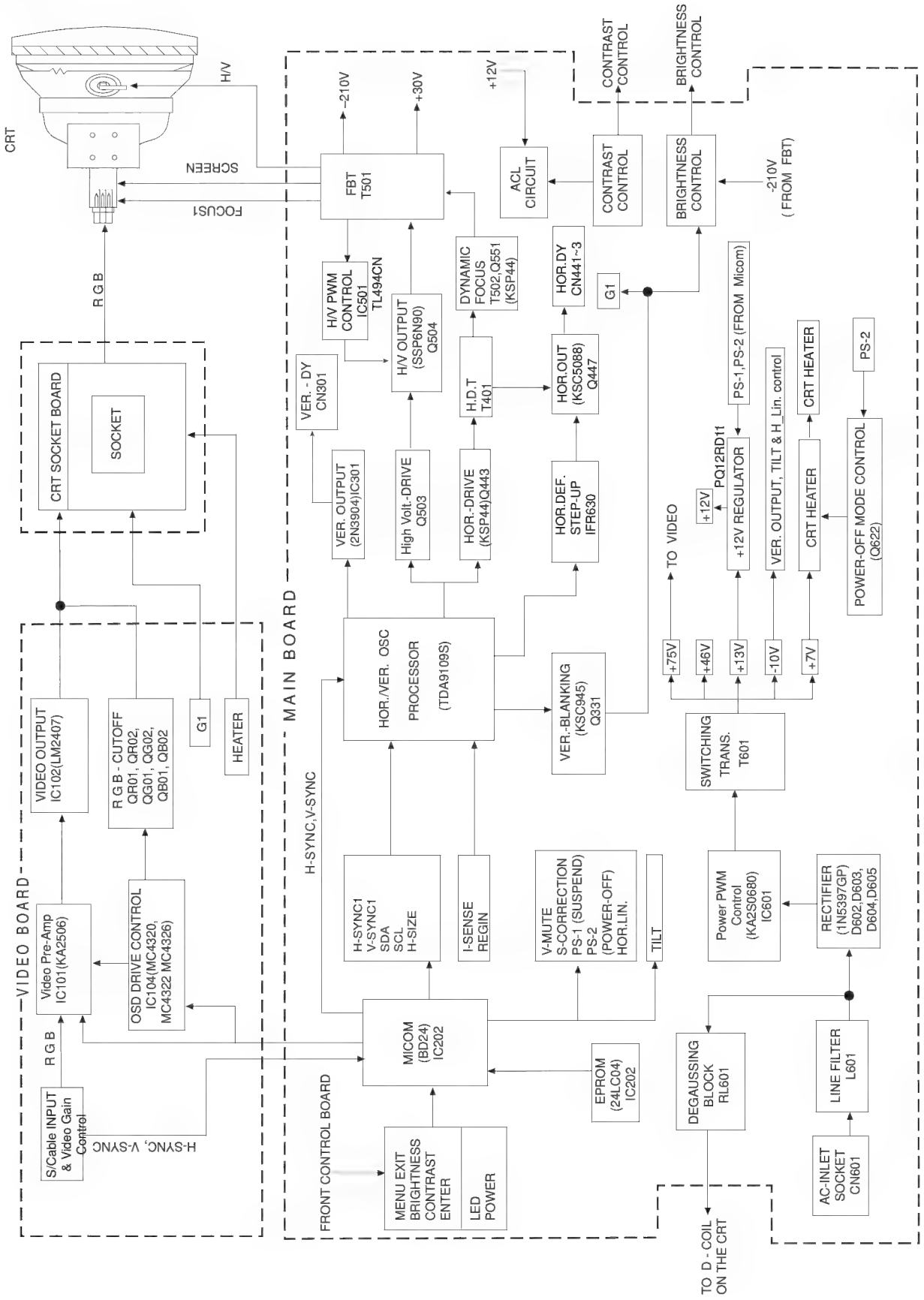
CHB5**7L



CHB6**7L


CRT
H/V
SCREEN
FOCUS1,2
R G B
CRT SOCKET BOARD
SOCKET
SK1
VIDEO BOARD
VIDEO OUTPUT
IC102(LM2407T)
R G B - CUTOFF
CONTROL
G1
HEATER
Video Pre-Amp
IC101 (KA2506)
OSD DRIVE CONTROL
IC104(MC4320,
MC4322 MC4326)
R G B
S/Cable INPUT
H-SYNC, V-SYNC
MAIN BOARD
H-SYNC,V-SYNC
HOR./VER. OSC
PROCESSOR
(TDA9109S)
IC401
VER.-BLANKING
GENERATOR
(Q301)
H-SYNC1
V-SYNC1
SDA
SCL
H-SIZE
I-SENSE
REGIN
H_Linearity
V-MUTE
S-CORRECTION
LED
PS-1 (SUSPEND)
PS-2 (POWER-
OFF)
TILT
MICOM
IC201
FRONT CONTROL BOARD
MENU EXIT
BRIGHTNESS
CONTRAST
ENTER
LED
POWER
DDC IC
(24LC21A)
IC203
EPROM
(24LC04B)
IC202
FBT
T501
-210V
+30V
+12V
ACL
CIRCUIT
High Voltage
CONTROL
IC501
High Voltage
CONTROL
OUTPUT
HOR.-DY
CN441
CN443
HOR.- OUT
Q447
H-DEF.
TRANS
T402
VER. - DY
CN301
VER. OUTPUT
IC301
High Volt.-DRIVE
Q503
HOR.-DRIVE
Q443
HOR.-DEF.
STEP-UP
G1
G1 VOLTAGE
CONTROL
-210V
(FROM FBT)
TO VIDEO
+12V
+12V REGULATION
VER. OUTPUT, TILT & H_LIN. CONTROL
CRT HEATER
HEATER
PS-2
POWER-OFF MODE CONTROL
(Q621, Q622)
To Audio Stand
+75V
+46V
+13V
-10V
+7V
+13V
SWITCHING
TRANS.
T601
PWM CONTROL &
SWITCHING FET
IC601
RECTIFIER
(D602, D603,
D604,D605)
DEGAUSSING
BLOCK
RL601
LINE FILTER
L601
AC-INLET
SOCKET
CN601
TO D - COIL
ON THE CRT

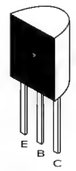
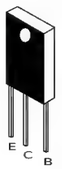
CHB7**7L

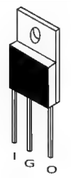
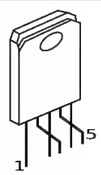

CRT
H/V
SCREEN
FOCUS1
R G B
CRT SOCKET BOARD
SOCKET
VIDEO BOARD
VIDEO OUTPUT IC102(LM2407)
R G B - CUTOFF QR01, QR02, QG01, QG02, QB01, QB02
G1
HEATER
Video Pre-Amp IC101(KA2506)
OSD DRIVE CONTROL IC104(MC4320, MC4322 MC4326)
S/Cable INPUT & Video Gain Control
H-SYNC, V-SYNC
FRONT CONTROL BOARD
MENU EXIT BRIGHTNESS CONTRAST ENTER
LED POWER
MAIN BOARD
H-SYNC,V-SYNC
HOR./VER. OSC PROCESSOR (TDA9109S)
MICOM (BD24) IC202
H-SYNC1 V-SYNC1 SDA SCL H-SIZE
I-SENSE REGIN
V-MUTE S-CORRECTION PS-1 (SUSPEND) PS-2 (POWER-OFF) HOR.LIN.
TILT
EPROM (24LC04) IC202
VER. OUTPUT (2N3904)IC301
VER. - DY CN301
High Volt.-DRIVE Q503
HOR.-DRIVE (KSP44)Q443
HOR.DEF. STEP-UP IFR630
VER.-BLANKING (KSC945) Q331
FBT T501
-210V
+30V
+12V
H/V PWM CONTROL IC501 TL494CN
H/V OUTPUT (SSP6N90) Q504
H.D.T T401
HOR.OUT (KSC5088) Q447
DYNAMIC FOCUS T502,Q551 (KSP44)
HOR.DY CN441~3
G1
ACL CIRCUIT
CONTRAST CONTROL
BRIGHTNESS CONTROL
-210V (FROM FBT)
CONTRAST CONTROL
BRIGHTNESS CONTROL
PS-1,PS-2 (FROM Micom)
+12V
PQ12RD11
+12V REGULATOR
VER. OUTPUT, TILT & H_Lin. control
CRT HEATER
CRT HEATER
PS-2
POWER-OFF MODE CONTROL (Q622)
TO VIDEO
+75V
+46V
+13V
-10V
+7V
SWITCHING TRANS. T601
Power PWM Control (KA2S0680) IC601
RECTIFIER (1N5397GP) D602,D603, D604,D605
DEGAUSSING BLOCK RL601
LINE FILTER L601
AC-INLET SOCKET CN601
TO D - COIL ON THE CRT

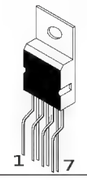
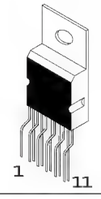
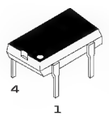
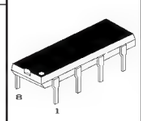
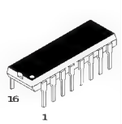
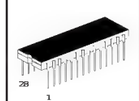
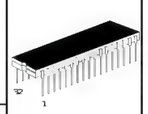
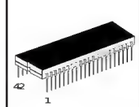
Memo

11 PCB Diagram

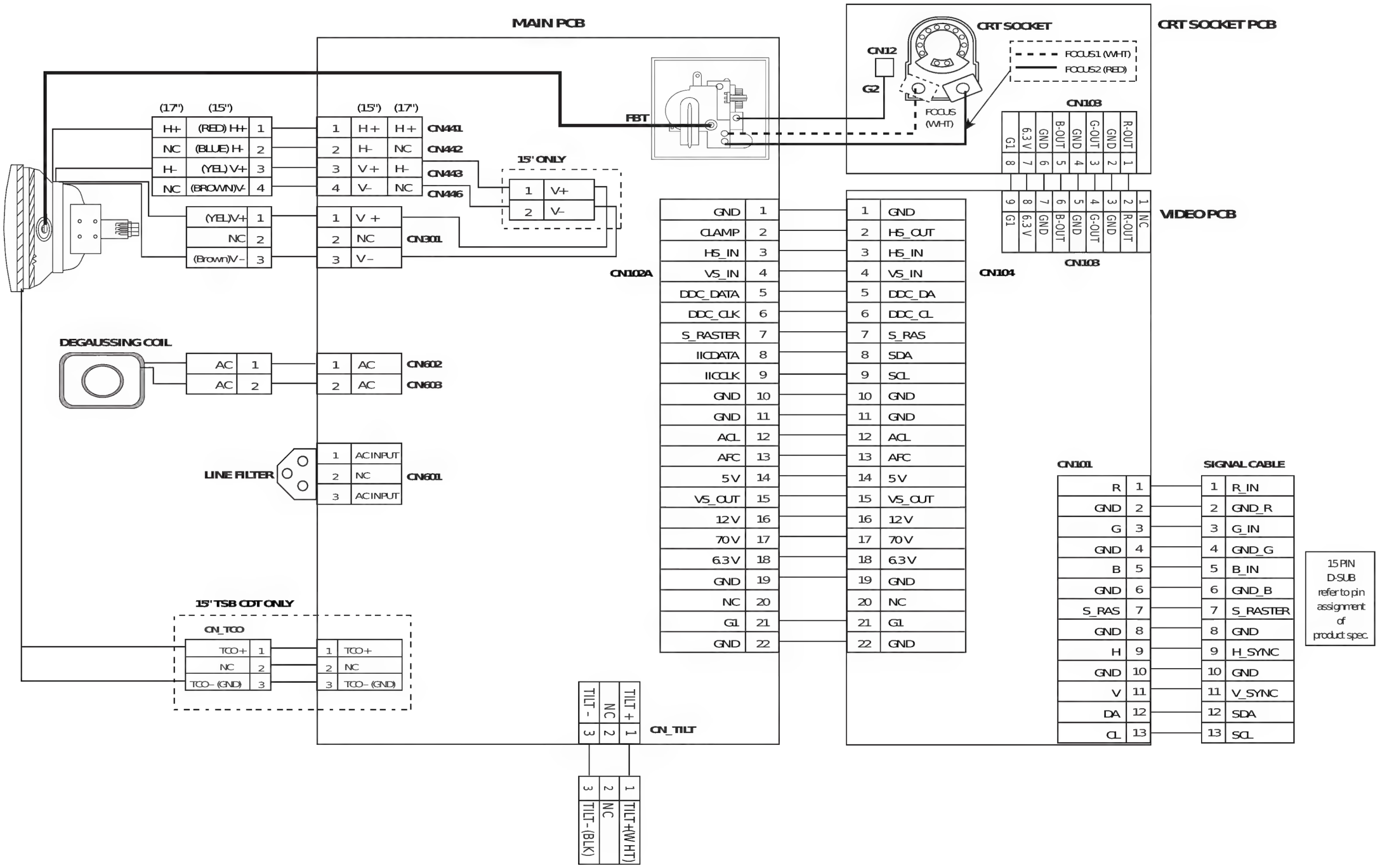
11-1 Semiconductor Lead Identification

PARTS	TYPE NO.	REF. NO.
	SD806U15C5	D442
	KSC945	Q201, Q331, Q402, Q624
	KSA733	Q401, Q501, Q506
	2N3906	Q432, Q509
	2N3904	Q103, Q431, Q441, Q503
	KSP44	Q443
	KSC1008	Q601
	2N6502	Q507
	KSD1616	Q321, Q471
	2N5551C	QR01, QG01, QB01
	KSB1116	Q322, Q472, Q621
	2N2401C	QR02, QG02, QB02
	KSB772	Q623
	IRF630	Q433, Q461
	IRF634A	Q502
	IRFR/U230A	Q462, Q463

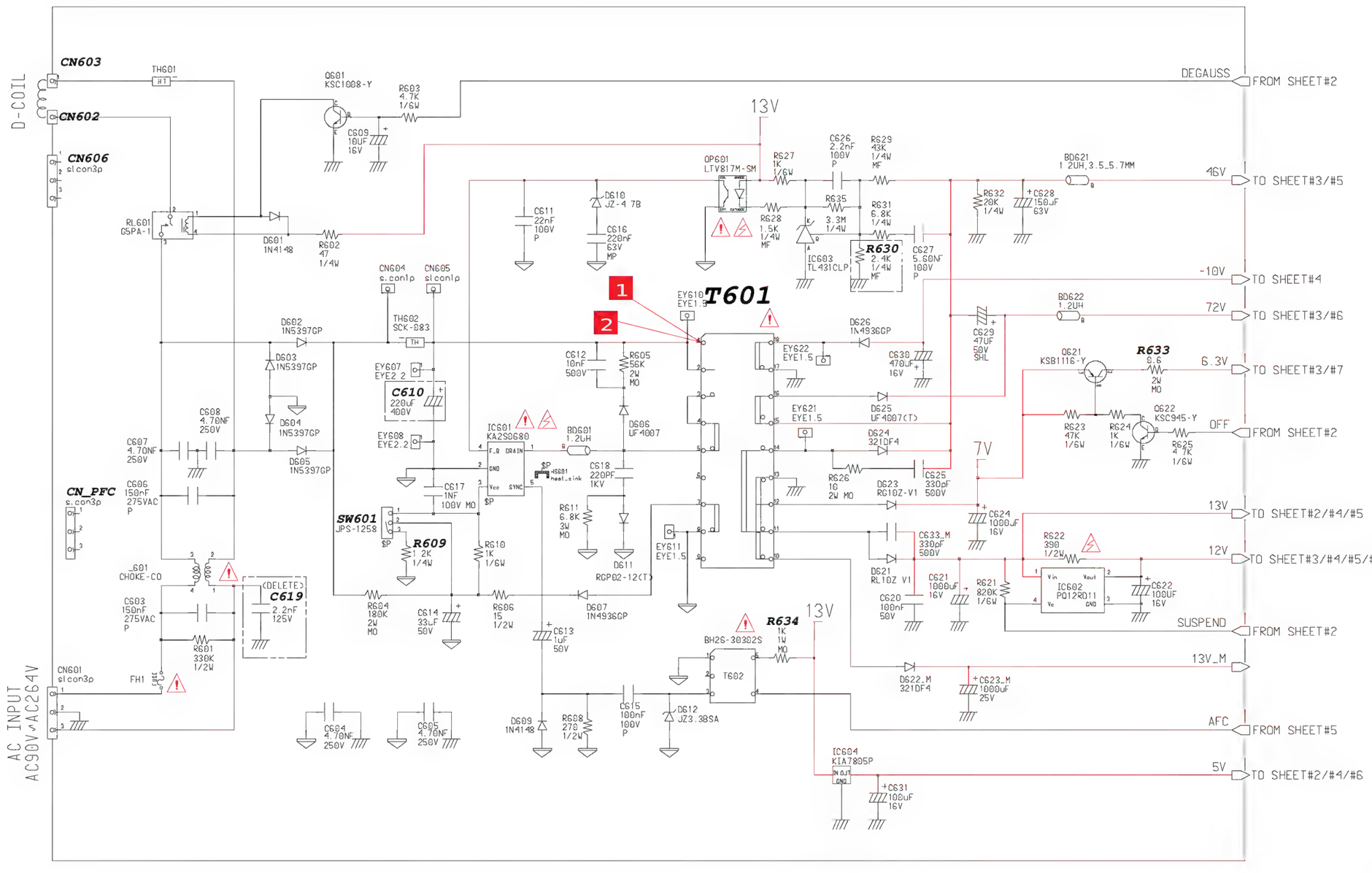
PARTS	TYPE NO.	REF. NO.
	KSC5088	Q447
	KA431	IC603
	KA7805	IC604
1 : Vin, 2 : Vout, 3 : GND, 4 : Vcc	PQ12RD11	IC602
 1 : Drain, 2 : GND, 3 : Vcc, 4 : F/B, 5 : Sync	KA2S0680	IC601
	SSS6N90A	Q504

PARTS	TYPE NO.	REF. NO.
	TDA9302H	IC301
	LM2407	IC102
	LTV817M-SM	QP601
	24LC04	IC202
	24LC21A	IC203
	TL494	IC501
	MC4320P	IC104
	KA2506	IC101
	TDA9109/S	IC401
	BD24	IC201

Memo


MAIN PCB
CRT SOCKET PCB
CRT SOCKET
CN12
G2
FOCUS1 (WHT)
FOCUS2 (RED)
FOCUS (WHT)
CN103
R-OUT
GND
G-OUT
GND
B-OUT
GND
6.3V
G1
VIDEO PCB
CN104
CN103
FBT
(17") (15")
H+ (RED) H+ 1
NC (BLUE) H- 2
H- (YEL) V+ 3
NC (BROWN) V- 4
(15") (17")
1 H+ H+ CN441
2 H- NC CN442
3 V+ H- CN443
4 V- NC CN446
15" ONLY
1 V+
2 V-
(YEL) V+ 1
NC 2
(Brown) V- 3
1 V+
2 NC
3 V-
CN301
CN102A
GND 1
CLAMP 2
HS_IN 3
VS_IN 4
DDC_DATA 5
DDC_CLK 6
S_RASTER 7
IICDATA 8
IICCLK 9
GND 10
GND 11
ACL 12
AFC 13
5V 14
VS_OUT 15
12V 16
70V 17
6.3V 18
GND 19
NC 20
G1 21
GND 22
1 GND
2 HS_OUT
3 HS_IN
4 VS_IN
5 DDC_DA
6 DDC_CL
7 S_RAS
8 SDA
9 SCL
10 GND
11 GND
12 ACL
13 AFC
14 5V
15 VS_OUT
16 12V
17 70V
18 6.3V
19 GND
20 NC
21 G1
22 GND
DEGAUSSING COIL
AC 1
AC 2
1 AC CN602
2 AC CN603
LINE FILTER
1 AC INPUT
2 NC
3 AC INPUT
CN601
15" TSB CDT ONLY
CN_TCO
TCO+ 1
NC 2
TCO- (GND) 3
1 TCO+
2 NC
3 TCO- (GND)
CN_TILT
TILT - NC TILT +
3 2 1
3 2 1
TILT- (BLK) NC TILT+(WHT)
CN101
R 1
GND 2
G 3
GND 4
B 5
GND 6
S_RAS 7
GND 8
H 9
GND 10
V 11
DA 12
CL 13
SIGNAL CABLE
1 R_IN
2 GND_R
3 G_IN
4 GND_G
5 B_IN
6 GND_B
7 S_RASTER
8 GND
9 H_SYNC
10 GND
11 V_SYNC
12 SDA
13 SCL
15 PIN D-SUB refer to pin assignment of product spec.

13-1 SMPS Part Schematic Diagram

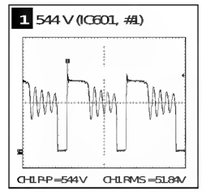


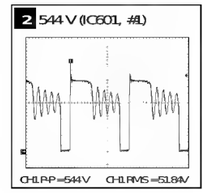
Power Line

Table 13-1. IC601 (KA2S0680)

pin #	MODES	
	800x600/85Hz	640x480/60Hz
1	1.05	10.30
2	GND	GND
3	–33.2 mV	–34.0 mV
4	–57.0 mV	–48.0 mV
5	–42.0 mV	–46.0 mV

Unit: Vrms





13-2 Micom Part Schematic Diagram

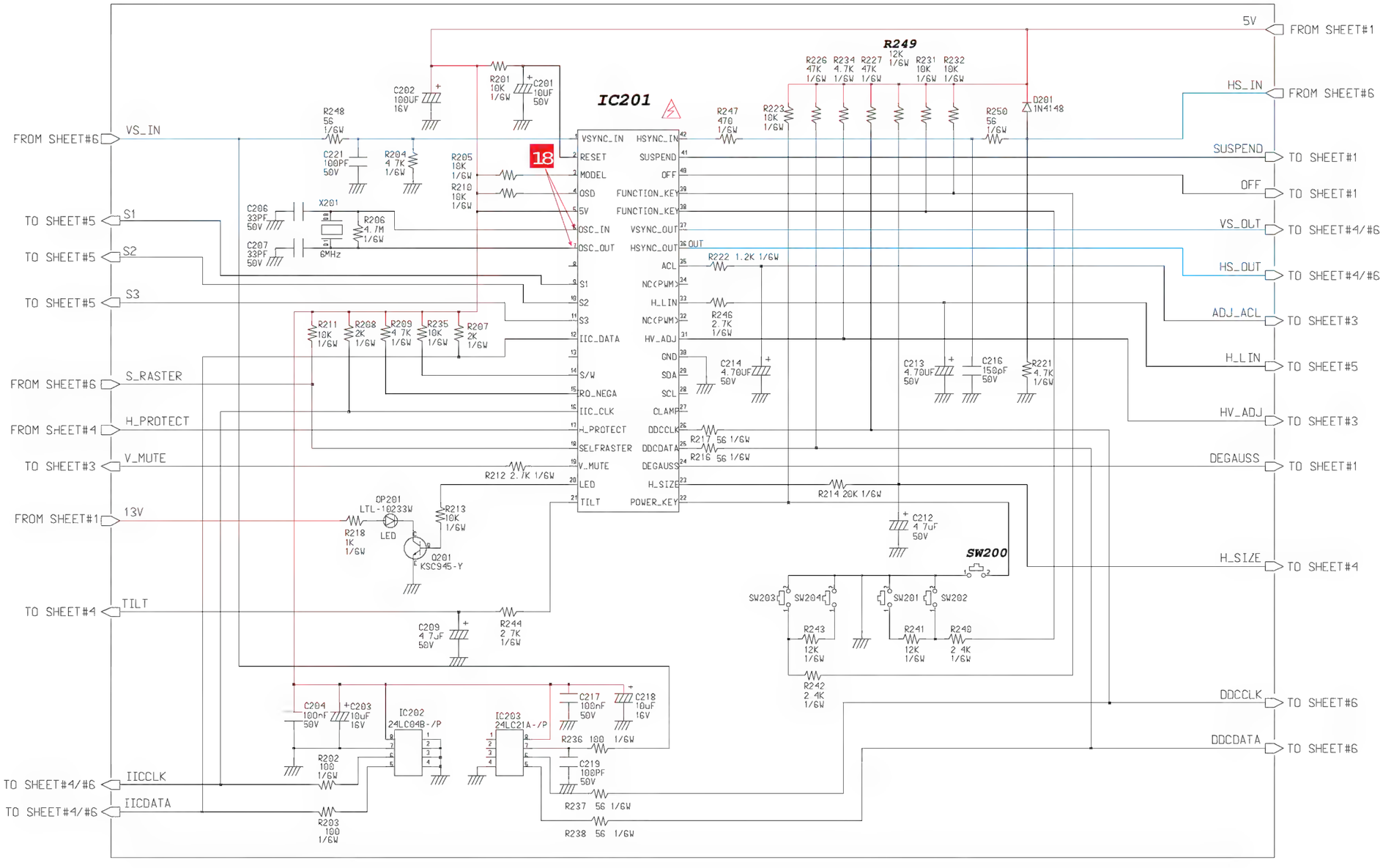
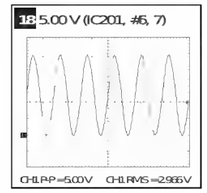


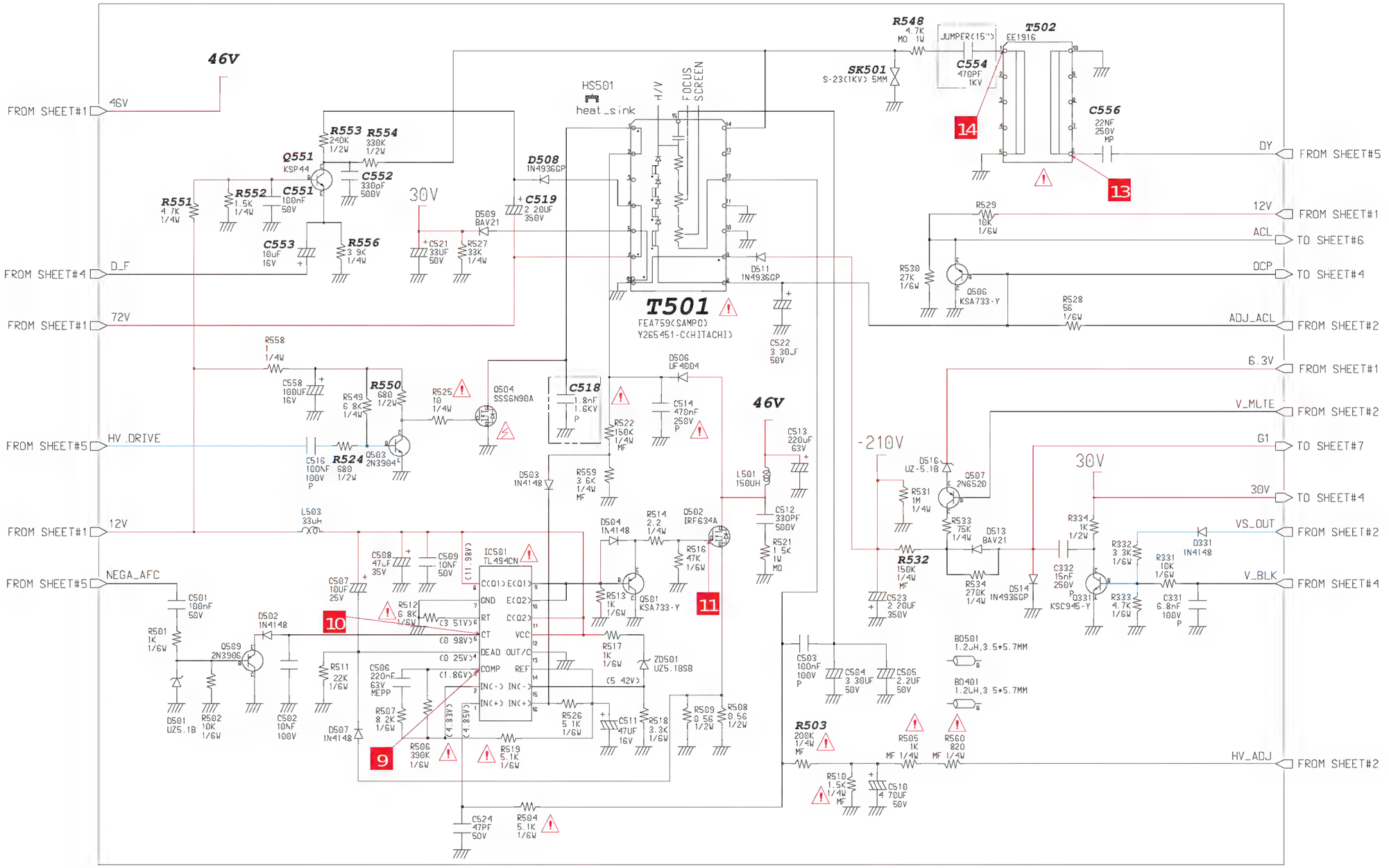
Table 13-2. IC201

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	4.370	4.706	22	5.079	5.081
2	5.080	5.079	23	2.511	4.054
3	−1.810 mV	−1.970 mV	24	4.700 mV	3.170 mV
4	5.080	5.080	25	3.633	3.635
5	5.085	5.085	26	3.517	3.519
6	2.450	2.450	27	NC	NC
7	2.123	2.121	28	NC	NC
8	NC	NC	29	NC	NC
9	14.53 mV	13.31	30	GND	GND
10	13.361	13.31	31	0.529	0.528
11	16.451 mV	13.31	32	NC	NC
12	5.084	5.090	33	3.998	5.035
13	NC	NC	34	NC	NC
14	−1.85 mV	−2.00 mV	35	3.837	3.840
15	5.066	5.067	36	4.751	4.465
16	5.084	5.085	37	8.430	6.310
17	−3.650 mV	−3.540 mV	38	5.079	5.082
18	52.28 mV	51.800 mV	39	5.079	5.082
19	10.02 mV	8.01 mV	40	5.031	5.034
20	5.039	5.042	41	5.073	5.076
21	1.629	1.630	42	0.298	4.334

Unit: Vrms



13-3 High Voltage Part Schematic Diagram



Power Line

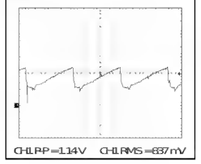
Signal Line

Table 13-3. IC501 (TL494CN)

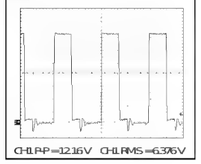
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	4.859	4.868
2	4.855	4.867
3	1.753	2.471
4	21.80 mV	12.40 mV
5	0.910	1.245
6	3.485	3.485
7	GND	GND
8	11.834	11.836
9	3.035	1.458
10	3.034	1.458
11	11.834	11.836
12	11.834	11.836
13	GND	GND
14	4.896	4.896
15	5.334	5.336
16	4.901	4.895

Unit: Vrms

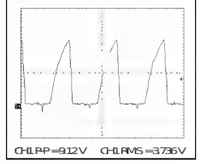
9 1.14 V (IC501, #8)



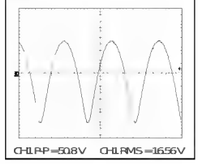
10 12.16 V (IC501, #5)



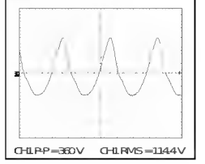
11 9.12 V (Q502, Gate)



13 50.8 V (T502, #6)



14 360 V (T502, #1)



13-4 H/V OSC & Vertical Parts Schematic Diagram

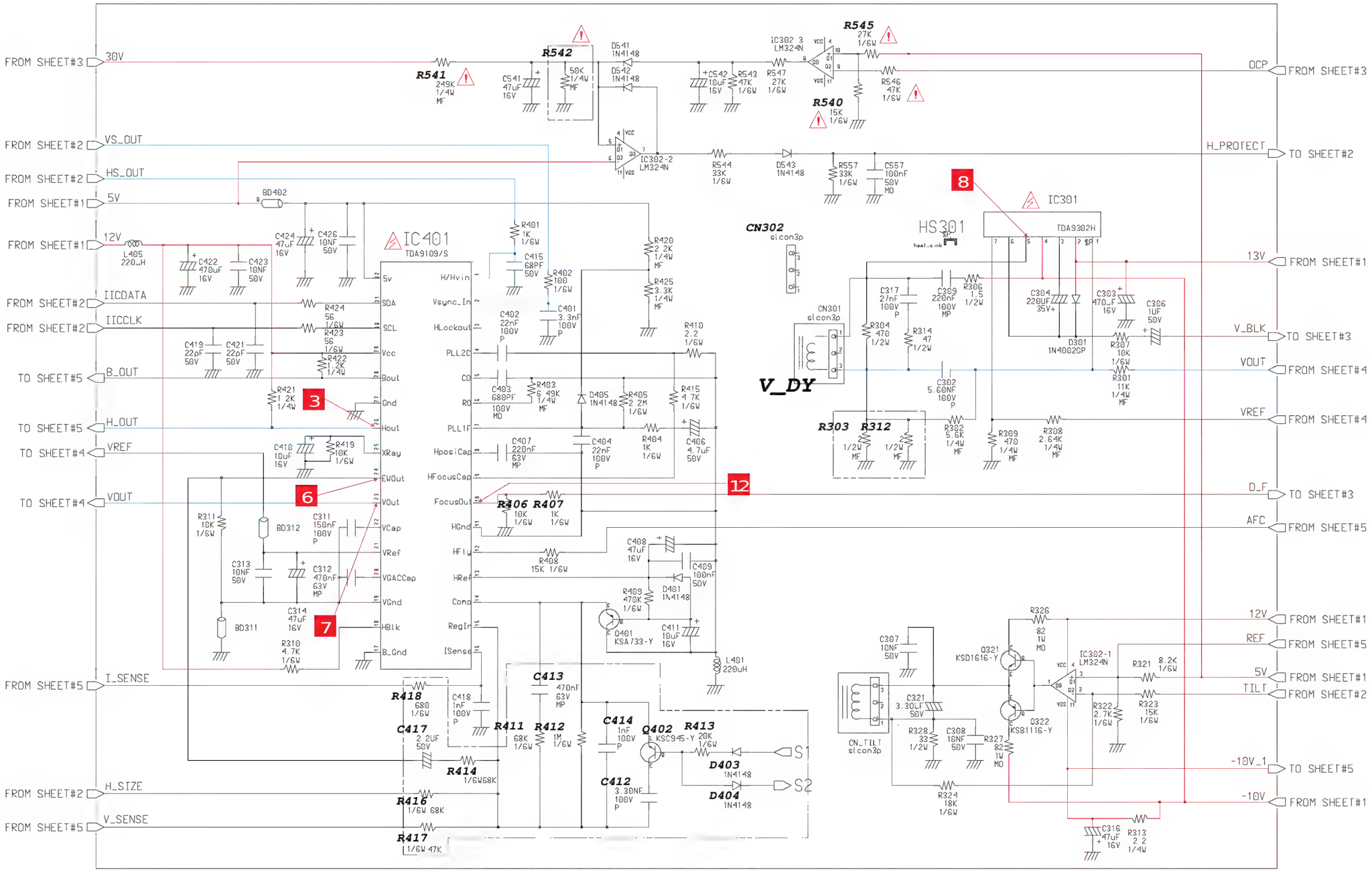


Table 13-4. IC301 (TDA9802H)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.221	1.223
2	13.368	13.314
3	–10.366	–10.435
4	–11.013	–10.913
5	–8.0 mV	–5.0 mV
6	13.111	12.936
7	1.225	1.225

Unit: Vrms

Table 13-5. IC302 (LM324N)

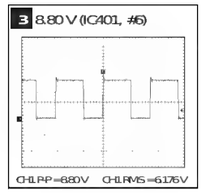
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	2.264	2.264
2	1.271	1.270
3	1.270	1.270
4	11.847	11.848
5	4.760	4.851
6	5.084	5.086
7	–10.894	–10.721
8	–10.307	–10.136
9	3.120	3.131
10	1.824	1.824
11	–10.888	–10.718
12	1.270	1.270
13	1.270	1.272
14	–2.616	–3.916

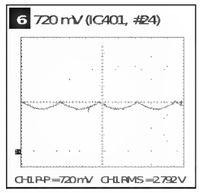
Unit: Vrms

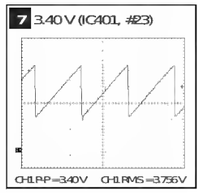
Table 13-6 IC401 (TDA9109/S)

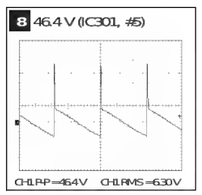
pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	4.753	4.467	17	GND	GND
2	10.70 mV	8.50 mV	18	11.626	11.627
3	5.084	5.084	19	–0.220	–0.670
4	2.840	3.324	20	5.256	5.470
5	4.183	4.255	21	8.166	8.162
6	2.527	1.531	22	3.560	3.570
7	2.534	1.537	23	3.600	3.610
8	3.663	3.778	24	2.951	3.367
9	0.216	0.225	25	30.91 mV	31.97 mV
10	2.247	2.752	26	4.432	4.812
11	77.18 mV	73.60 mV	27	GND	GND
12	–0.367	–0.447	28	2.861	1.358
13	8.072	8.070	29	11.632	11.633
14	4.748	3.850	30	5.083	5.086
15	5.040	5.145	31	5.083	5.086
16	0.153	51.50 mV	32	5.084	5.087

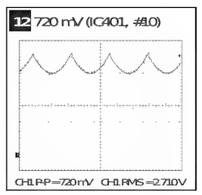
Unit: Vrms



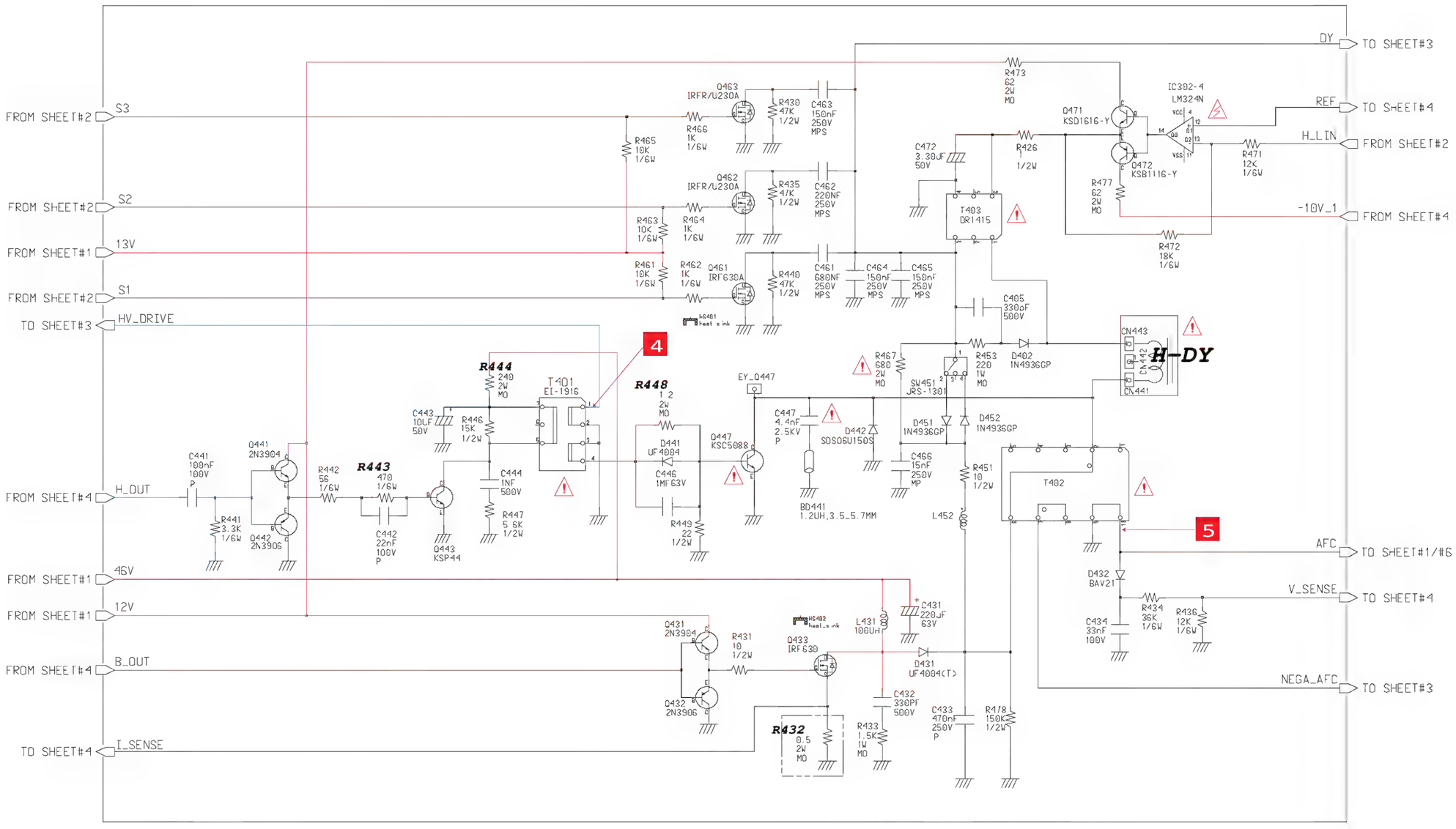


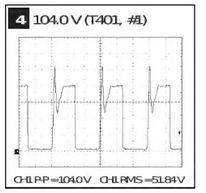


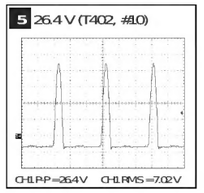




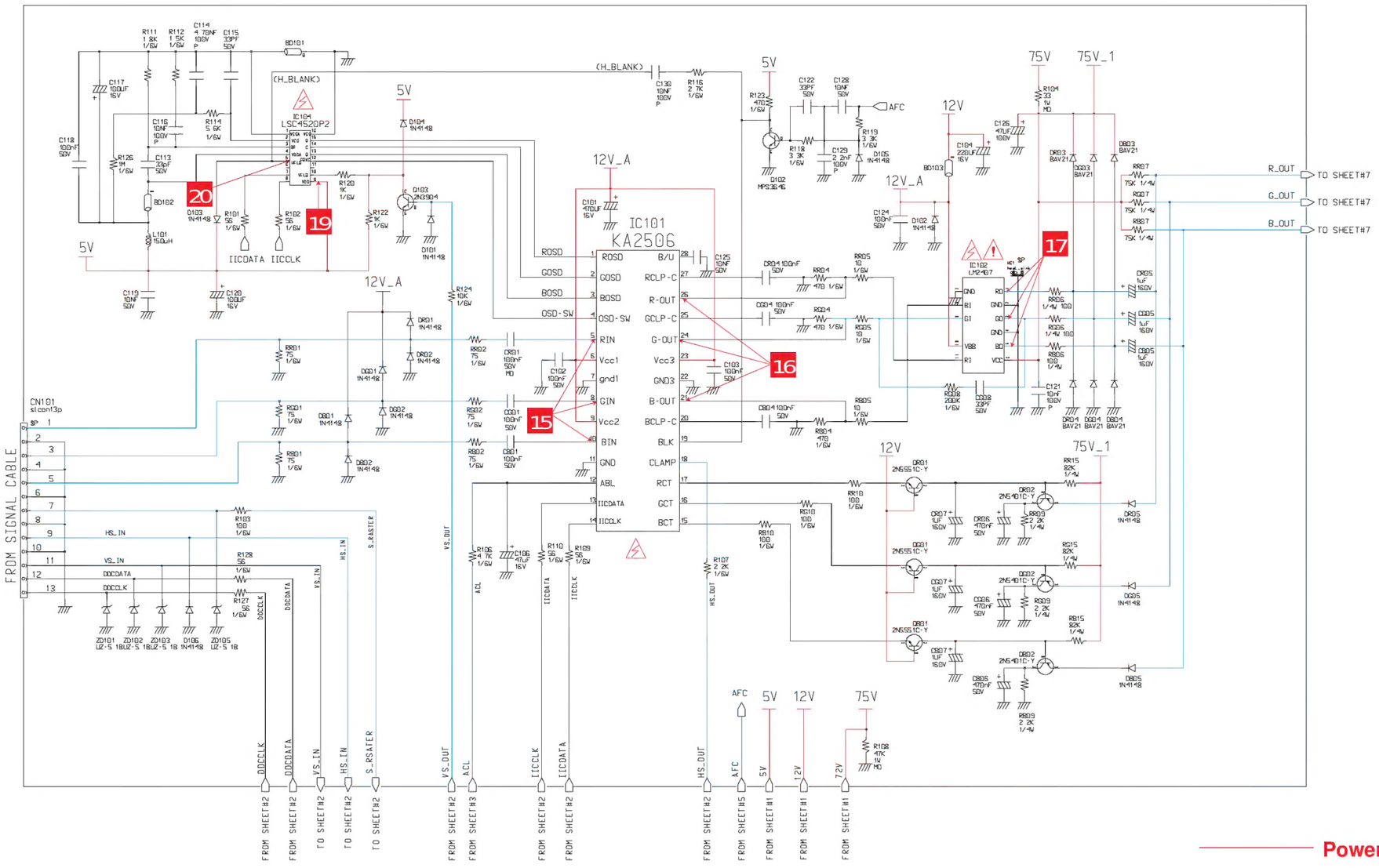
13-5 Horizontal Part Schematic Diagram




4 104.0 V (T401, #1)
CH1 P-P =104.0 V CH1 RMS =51.84 V


5 26.4 V (T402, #10)
CH1 P-P =26.4 V CH1 RMS =7.02 V

13-6 Video Part Schematic Diagram



Power Line

Signal Line

Table 13-7. IC101 (KA5606)

pin #	MODES		pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz		800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	2.187	2.183	15	11.185	11.178
2	2.213	2.210	16	11.179	11.171
3	2.201	2.203	17	11.197	11.188
4	0.147	0.149	18	4.750	4.463
5	2.416	2.428	19	4.320	4.635
6	11.796	11.790	20	4.360	4.406
7	GND	GND	21	2.299	2.449
8	2.397	2.409	22	GND	GND
9	11.795	11.790	23	11.796	11.791
10	2.407	2.419	24	2.381	2.531
11	GND	GND	25	4.540	4.389
12	4.158	4.164	26	2.565	2.719
13	5.083	5.084	27	4.420	4.462
14	5.083	5.084	28	91.96 mV	92.85 mV

Unit: Vrms

Table 13-8. IC102 (LM2407)

pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	37.920	35.970
2	GND	GND
3	40.214	38.230
4	GND	GND
5	41.230	39.274
6	72.018	71.988
7	GND	GND
8	2.303	2.447
9	2.385	2.529
10	11.793	11.792
11	2.568	2.717

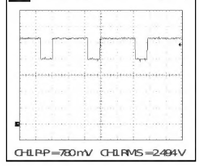
Unit: Vrms

Table 13-9. IC104 (LSC4520P2)

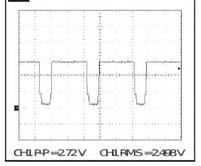
pin #	MODES	
	800 x 600 / 85 Hz	640 x 480 / 60 Hz
1	1.54 mV	1.74 mV
2	2.279	1.376
3	2.278	1.381
4	5.047	5.061
5	3.757	4.022
6	NC	NC
7	5.082	5.084
8	5.082	5.084
9	5.080	5.083
10	5.054	5.063
11	NC	NC
12	0.147	0.147
13	2.207	2.208
14	2.213	2.212
15	2.187	2.188
16	1.580 mV	1.870 mV

Unit: Vrms

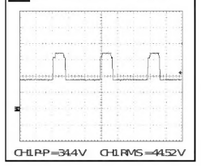
15 780 mV (IC101 #5, 8, 10)



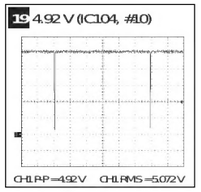
16 2.72 V (IC101 #21, 24, 26)



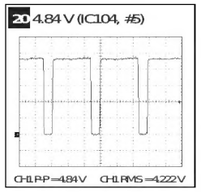
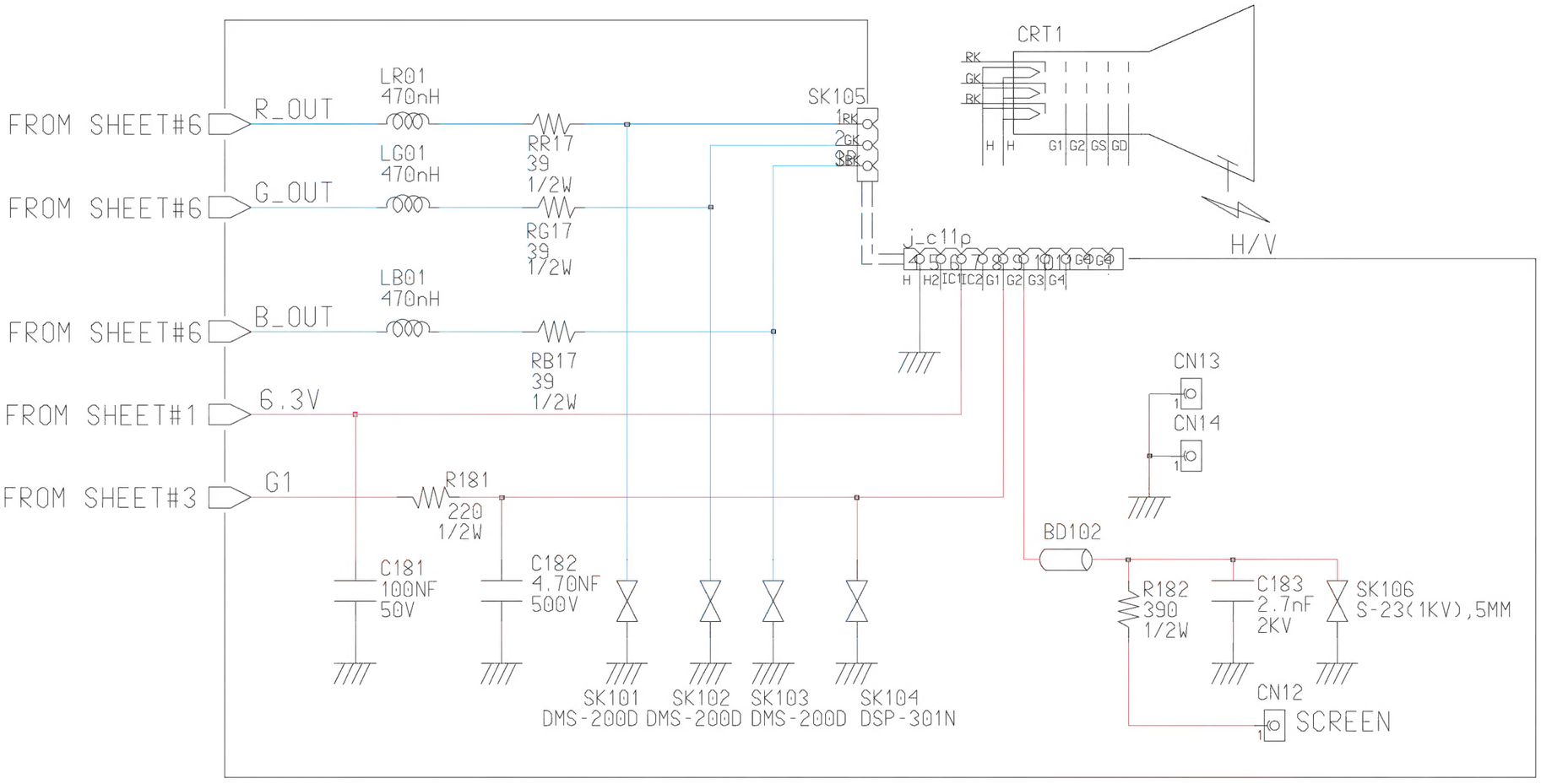
17 34.4 V (IC102 #1, 3, 5)



19 4.92 V (IC104, #10)



20 4.84 V (IC104, #5)



13-7 CRT Part Schematic Diagram